

D'Fusion[®] Studio

User Guide

21/09/12

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1. INTRODUCTION

1.1 Object

This document describes the Graphical User Interface of D'Fusion Studio. A quick start guide is also included to get you started with D'Fusion Studio.

1.2 External documentation

1.2.1 Reference documents

- [01] D'Fusion Studio - User Guide, Total Immersion
DFusion Studio - User Guide.pdf
- [02] D'Fusion Augmented Reality - Reference Manual, Total Immersion
DFusion AR - Reference Manual.pdf
- [03] D'Fusion Augmented Reality - Lua API, Total Immersion
DFusion AR - Lua API.pdf
- [04] D'Fusion Augmented Reality - Physics Plugin, Total Immersion
DFusion AR - Physics Plugin.pdf
- [05] D'Fusion Computer Vision - Reference Manual, Total Immersion
DFusion CV - Reference Manual.pdf
- [06] D'Fusion Exporter for Maya - User Manual, Total Immersion
DFusion Exporter for Maya - User Guide.pdf
- [07] D'Fusion Exporter for Maya - Modeling Constraints, Total Immersion
DFusion Exporter for Maya - Modeling Constraints.pdf
- [08] D'Fusion Exporter for 3dsMax - User manual, Total Immersion
DFusion Exporter for 3dsMax - User Guide.pdf
- [09] D'Fusion Exporter for 3dsMax - Modeling Constraints, Total Immersion
DFusion Exporter for 3dsMax - Modeling Constraints.pdf



1.2.2 Other documents

- [10] LUA 5.1 Reference Manual
www.lua.org/manual/5.1

1.3 Glossary & Acronyms

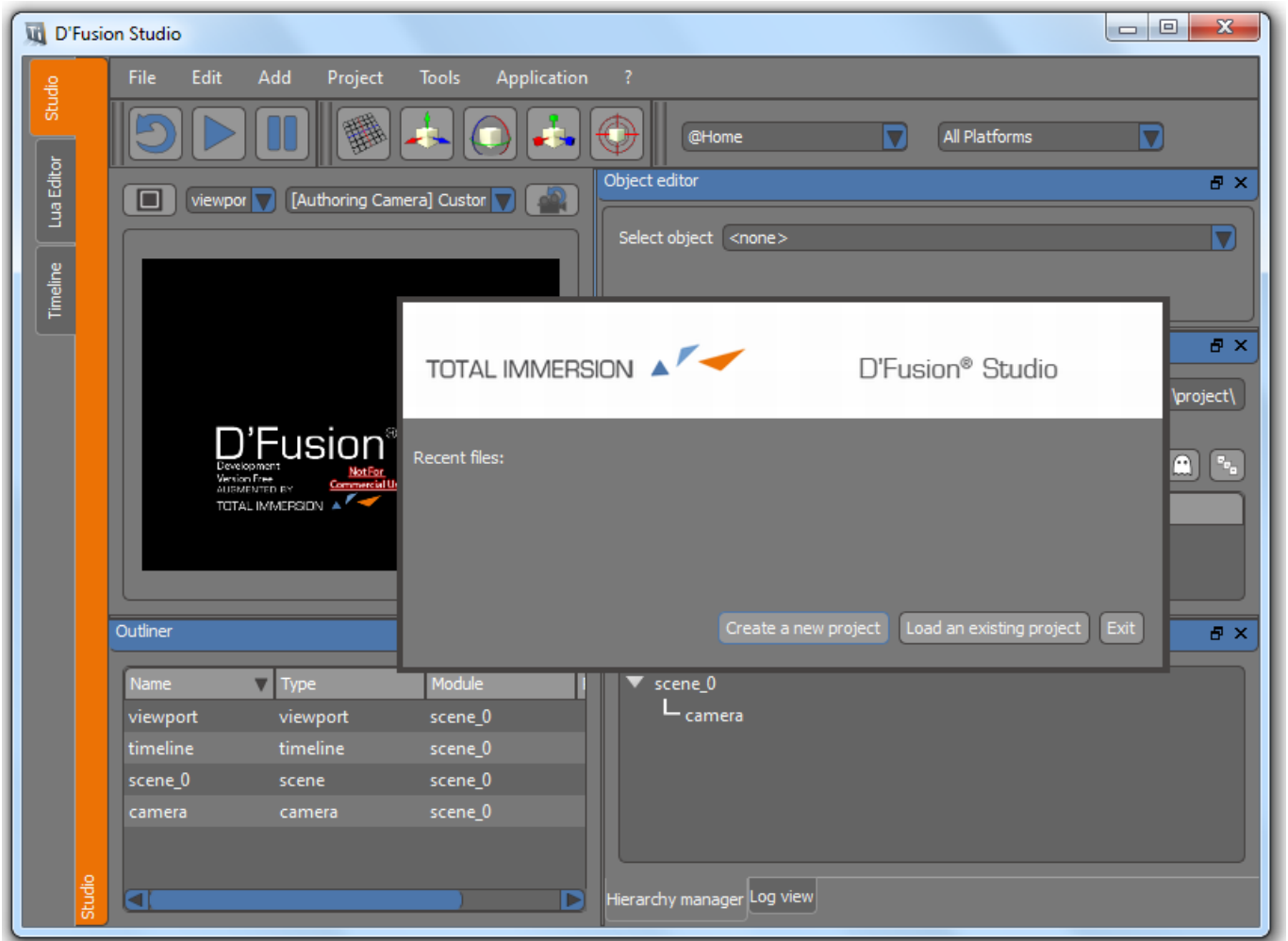
TI	Total Immersion
AR	Augmented Reality
MLT	MarkerLess Tracking
CV	Computer Vision

1.4 Presentation rules

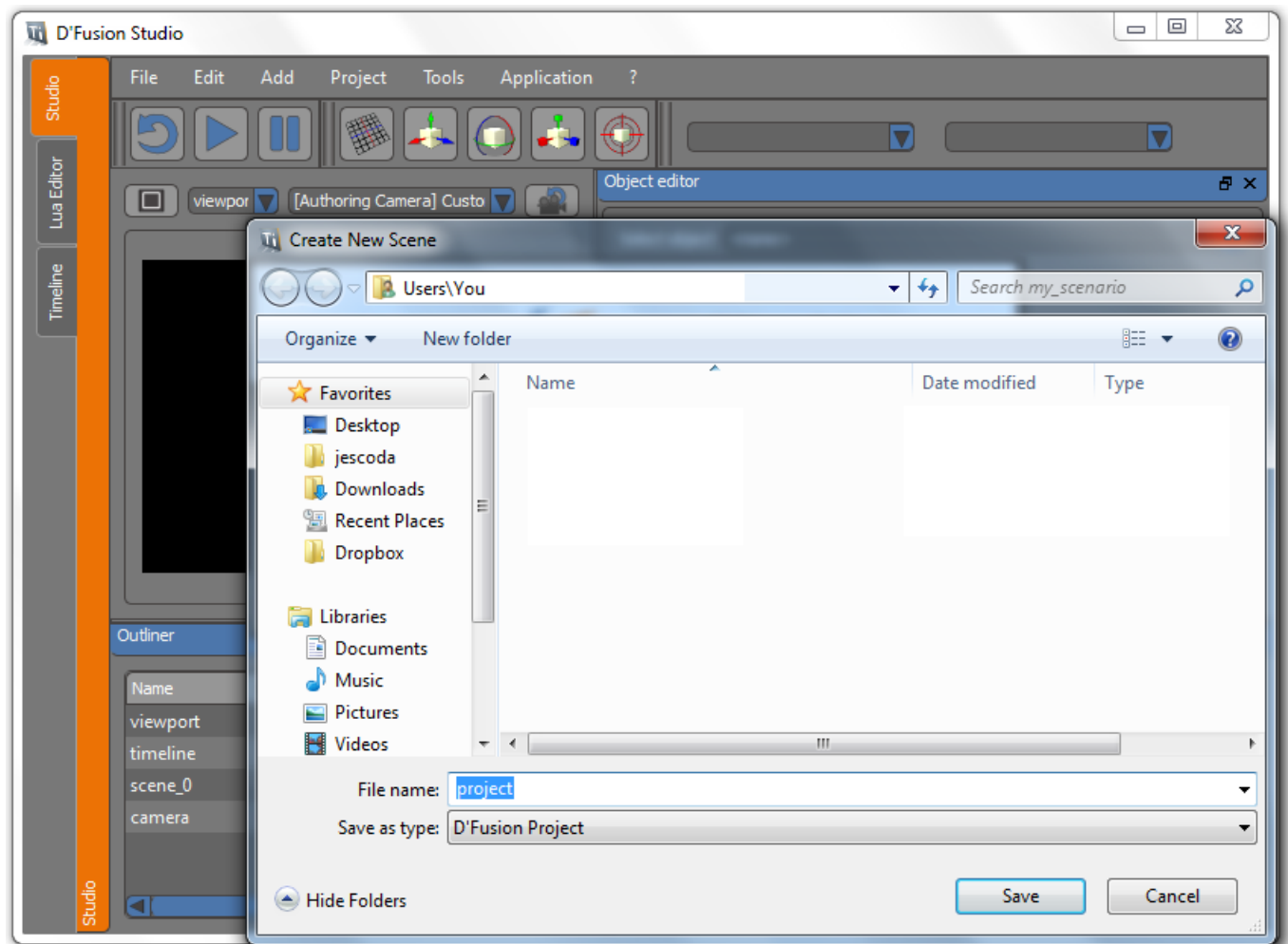
Presentation	Content
Xxxxxxxx	File name
 Xxxxxxxx	Script : code samples
Xxxxxxx	Key word
 Xxxxxxx	Reminder : main information of the chapter
Xxxxxxxxxx	User Interface Command
Xxxxxxxxxx	Keyboard key

2. QUICK START

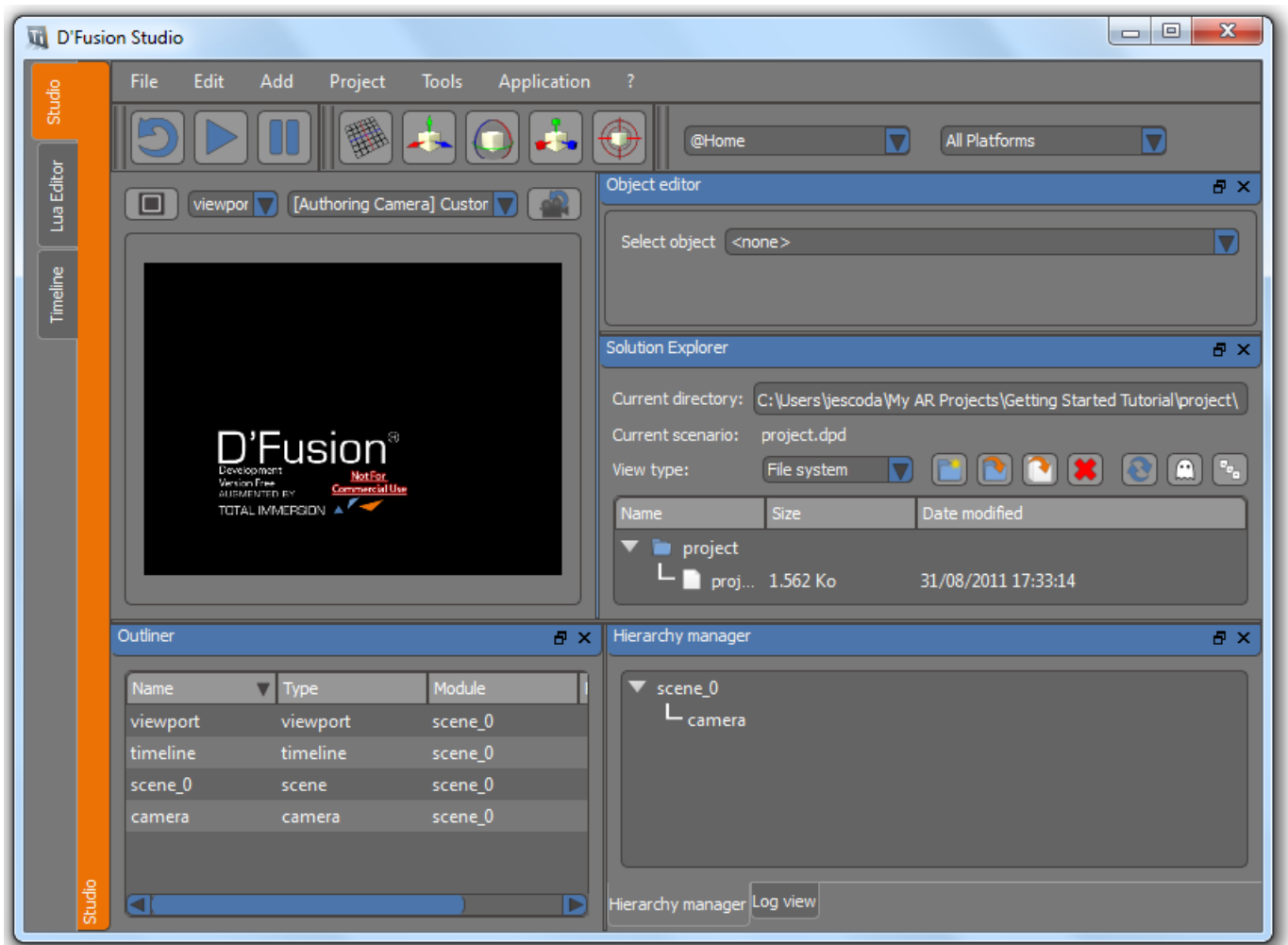
When you open D'Fusion Studio, you get this:



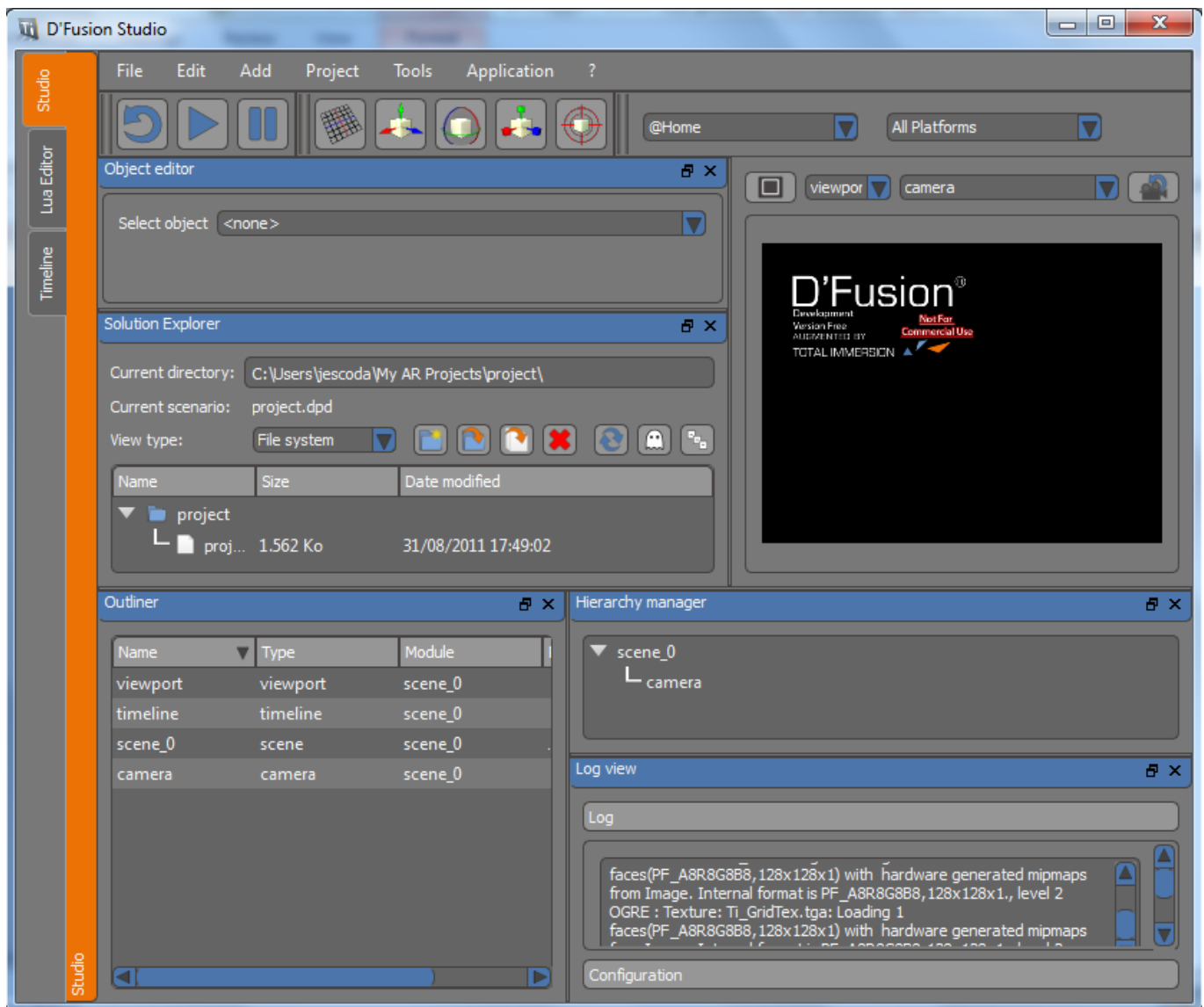
The startup dialog lets you choose between loading a recent project, browsing for a specific project or creating a new project. If you choose to create a new project, you will be asked to save your new scene file. The directory where you save your project will be considered as the project directory (i.e. the one used by default to save all your project files).



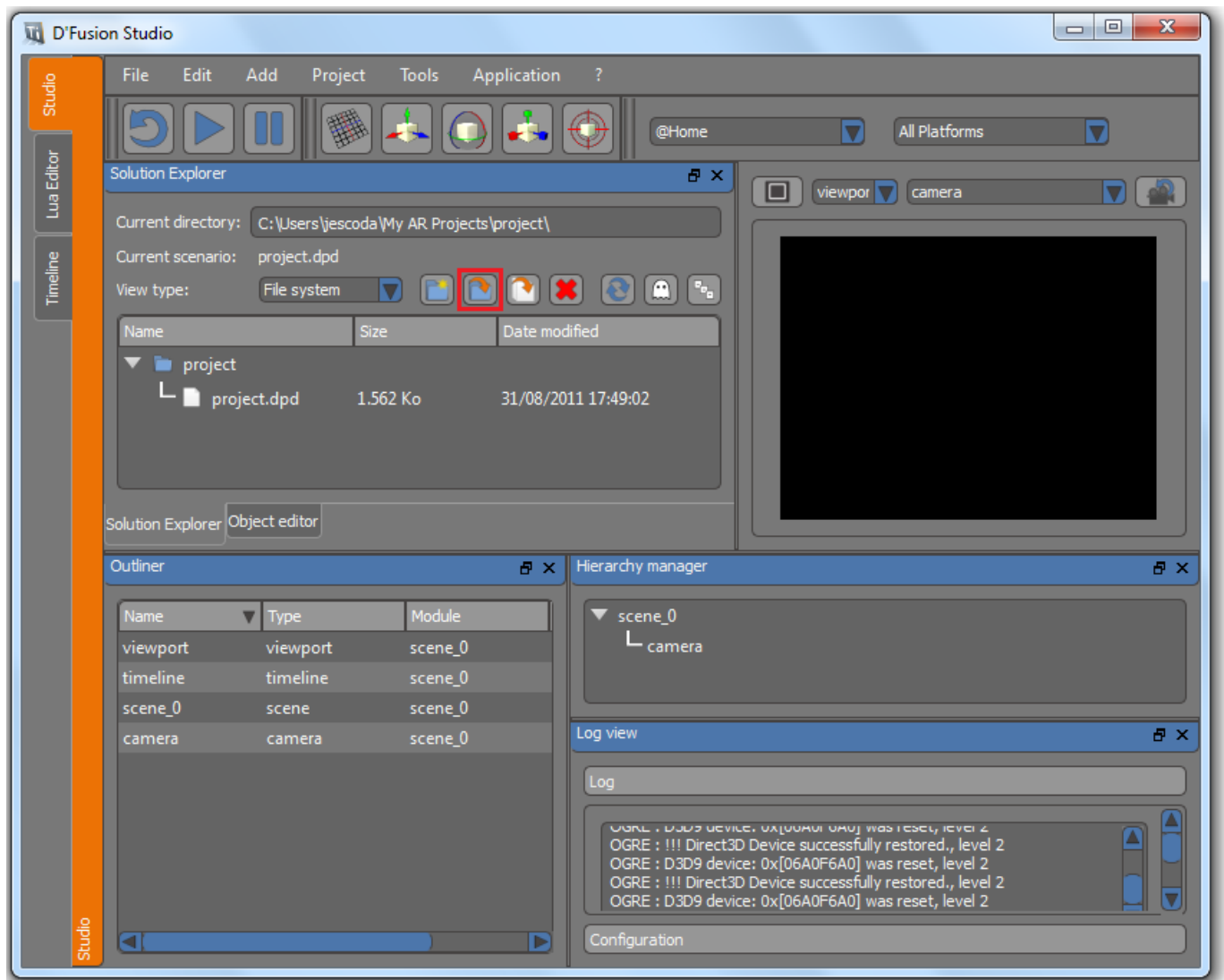
A scene with a camera, a viewport and a timeline is created. You will be able to review information about your scene (objects, hierarchy and properties) from the different panels.



The D'Fusion Studio interface is modular, so you can move panels and dock them wherever you want within the main interface, or undock them to have floating windows; their size and position are saved when you quit the application and stored for your next session.

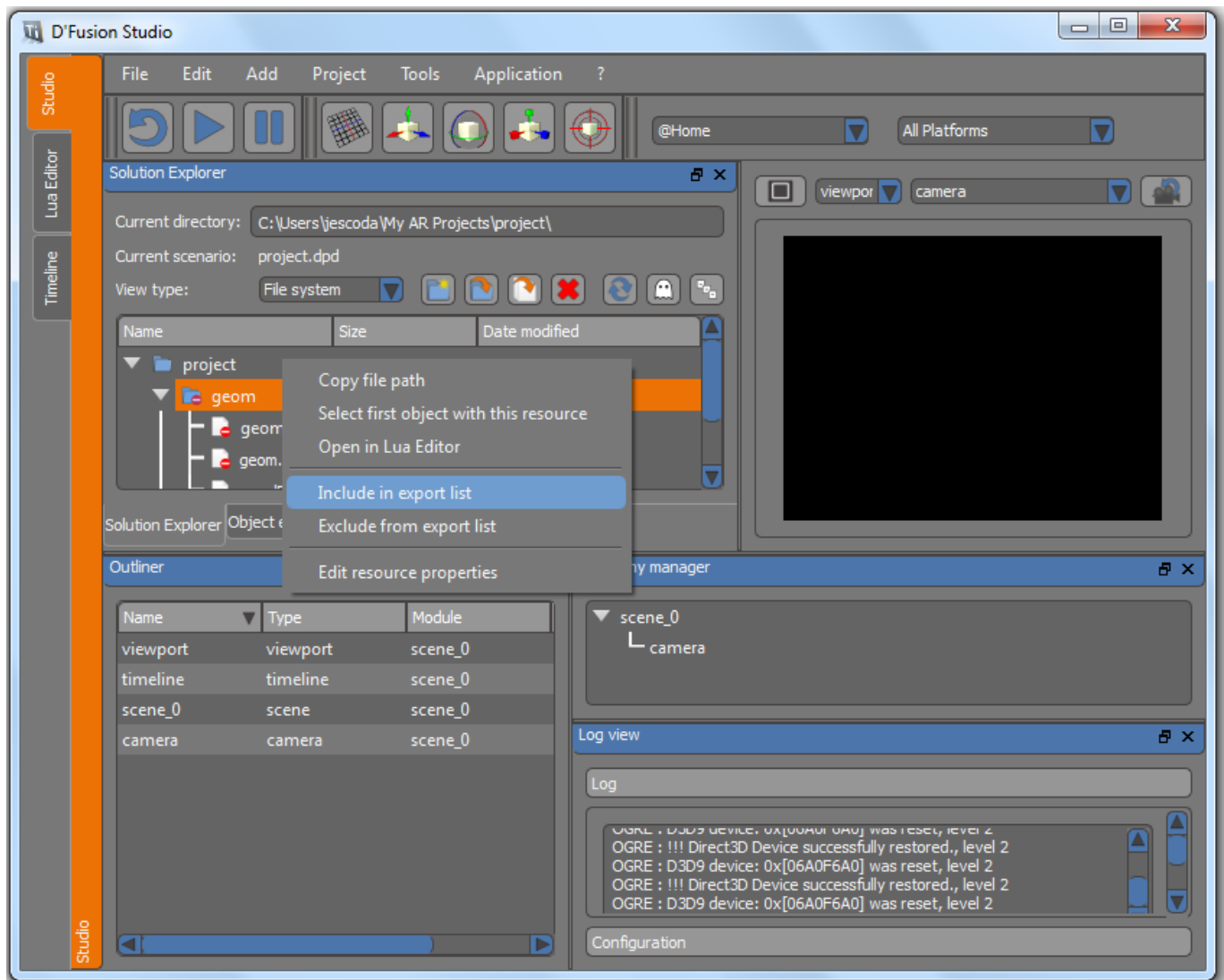


Now, you can add new entities to your scene. But first, import resource files into your project directory. Open the "Solution Explorer" window and click on the "Import directory" button.

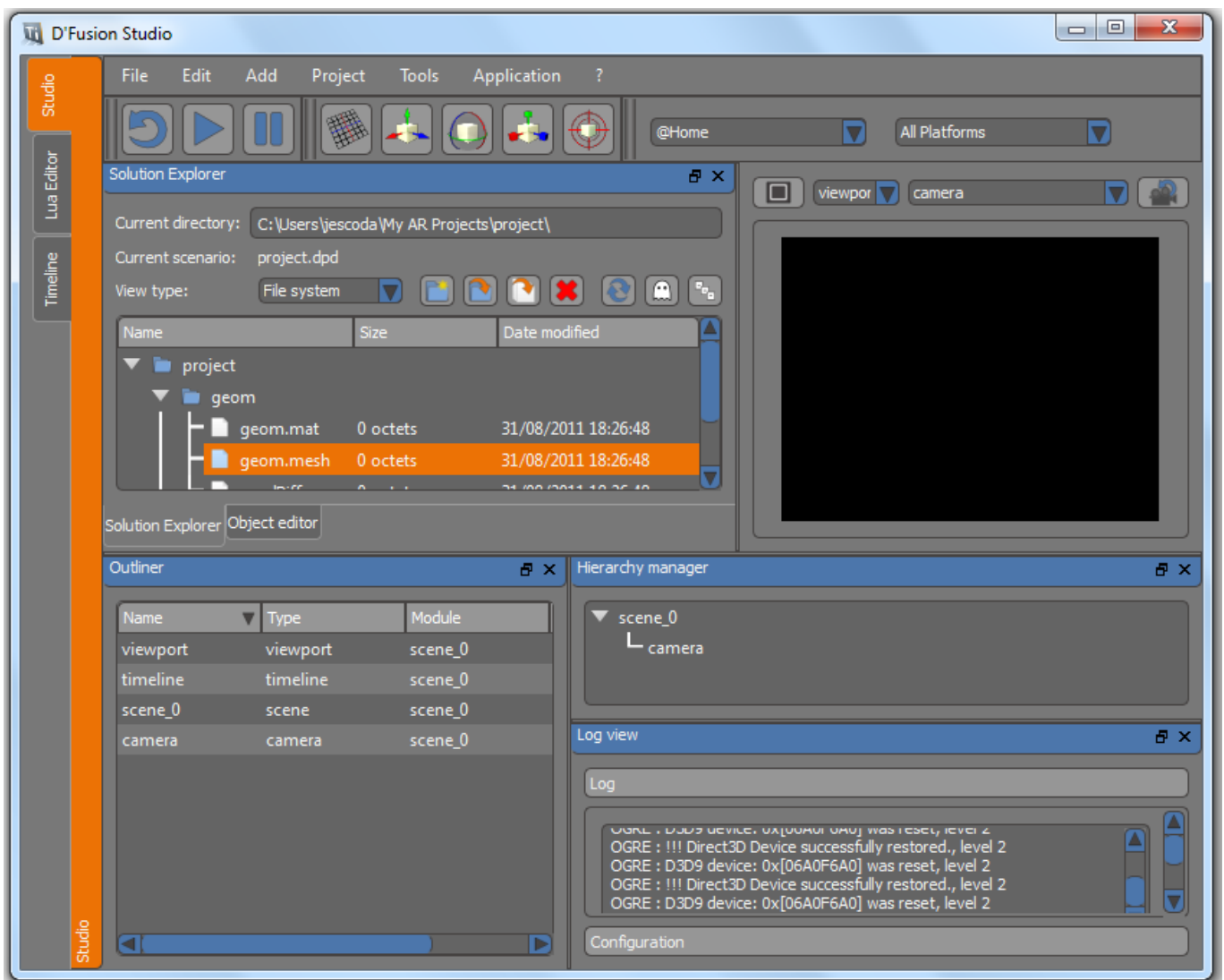


Select the directory that contains the media you want import. Imported files are then copied into the project directory and appear in the "Solution Explorer".

Include files according to the target/platform of your application.



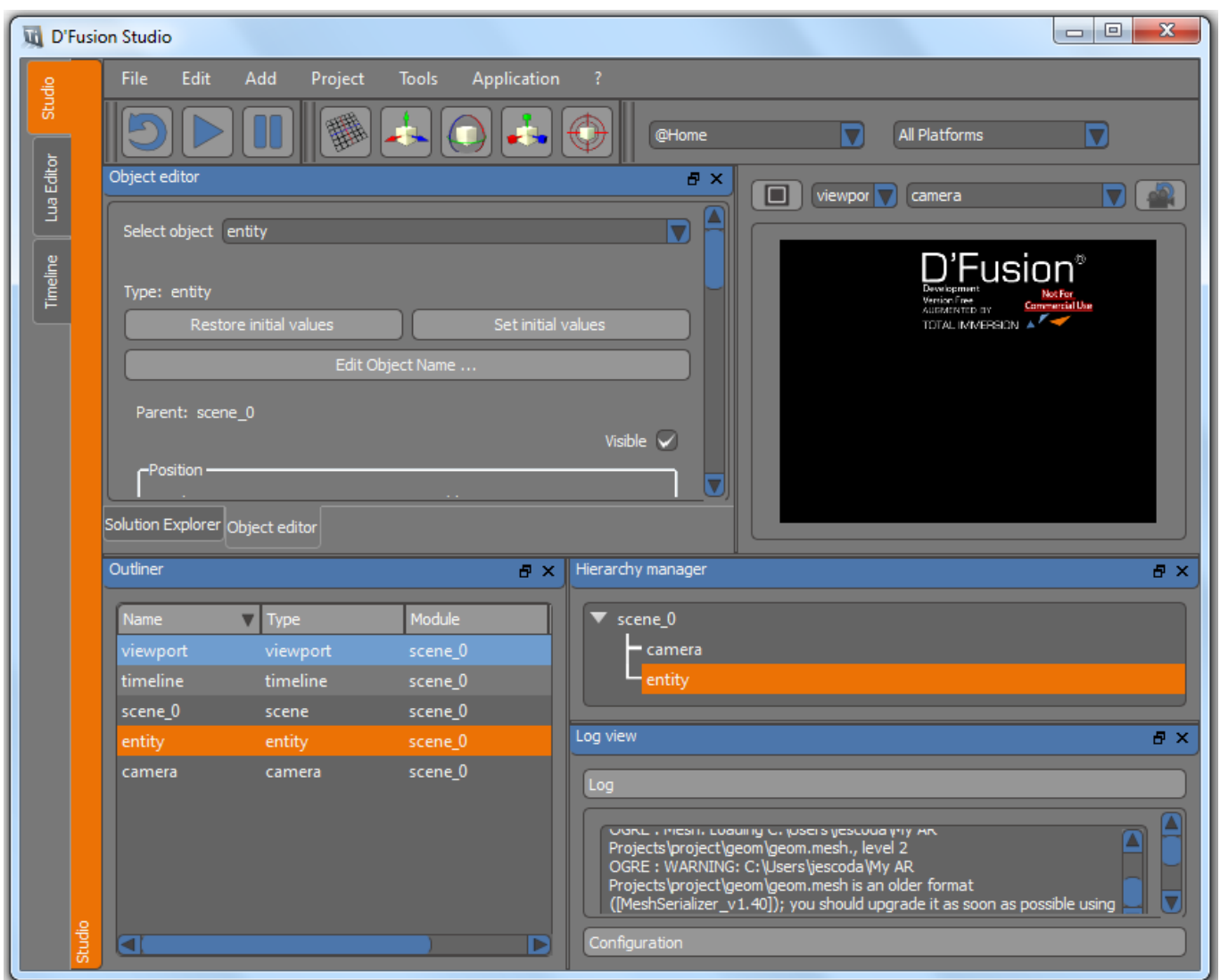
Now, drag and drop the .mesh file from the Solution explorer to the viewport window to create a new "Entity". The object is visible in the "Outliner" and its properties in the "Object Editor".



After you imported your first object, you will notice you still cannot see anything. You actually need a light in your scene. Add a new light with the menu "Add > Effects > Light".

You still don't see anything? You may now need to move your objects from the default position. When created, all objects are centered in the scene origin, at (0, 0, 0). So your light cannot illuminate your object correctly for the moment.

Go into the panel "Object Editor": the top combo-box lets you browse all the objects of your scene to edit their properties. Select the camera (default camera is simply called "camera") and move it at position (0, 0, 10). You can go farther if your object is bigger of course. Then select the light you created and move it away from the object also.



You see the "Object Editor" panel is not surrounded with an orange line. This line indicates that the current value of your object has been modified. Objects in Studio have an initial value, which is, for all the parameters of the object, the start-up value when you launch the scene. When you will save, this is the value written to file. This important notion lets you modify your scene or play it without altering the possibility to save a modification on one object.

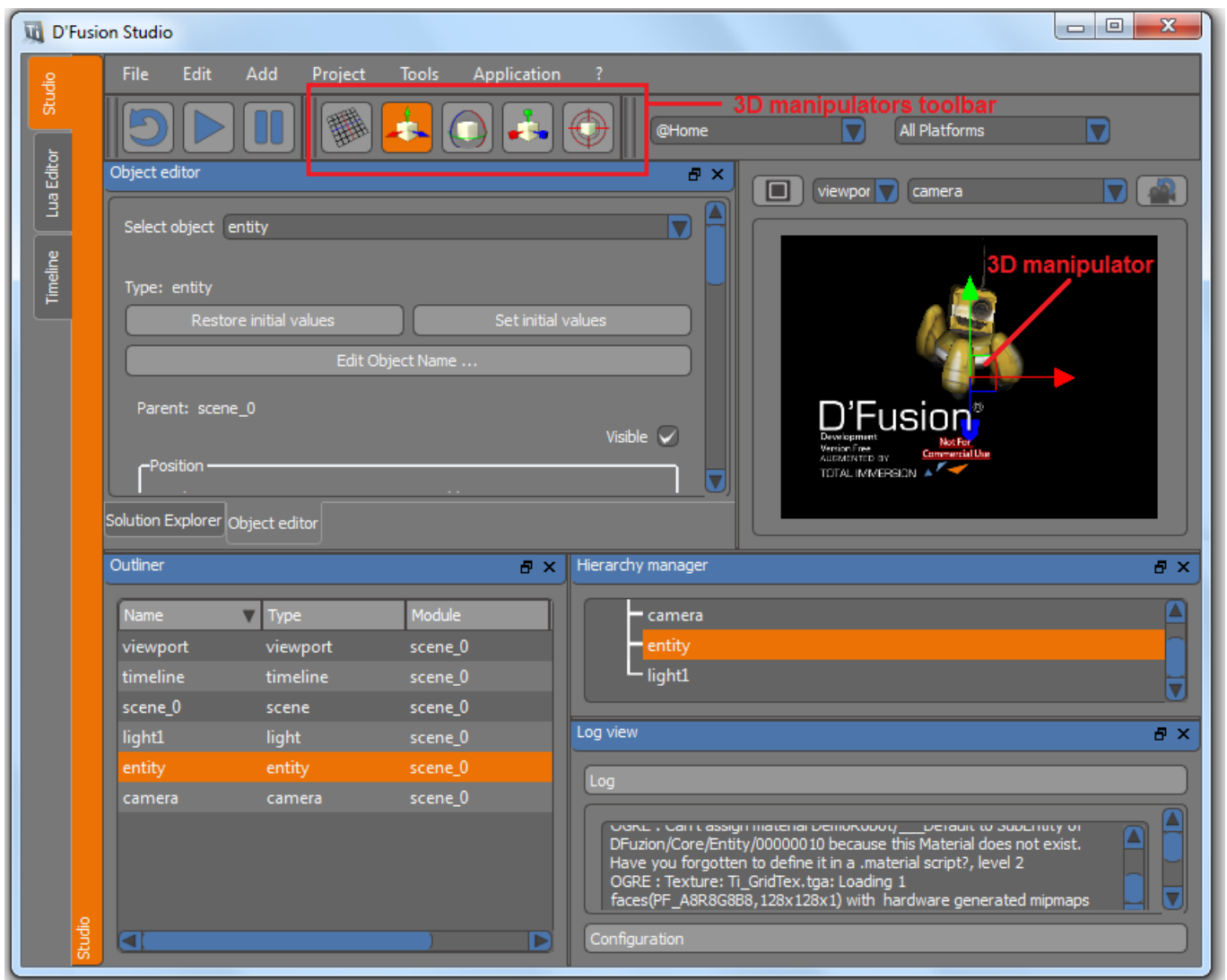
If you save your file now, the saved position will be (0, 0, 0) not (0, 5, 5). To save initial values of the current object, simply push the "Set initial values" button. The surrounding line will disappear to indicate that your object's current values now match the initial values.

After that, you can adjust the camera's point of view with the mouse in the 3D view. At the top of the 3D view, a dropdown list let you choose, for each viewport, an authoring camera to visualize your scene. Authoring cameras are here to help you place and visualize your scene during edition without actually moving around the scene camera. These controls are not accessible when the scene is playing.

You can edit camera's point of view with wheel mouse (traveling), *Alt + Middle* button (panning), *Alt + Left* button (trackball). Trackball is only available for custom and current camera.



You can also adjust the positions and orientations of objects directly in the 3D view when you activate manipulators.

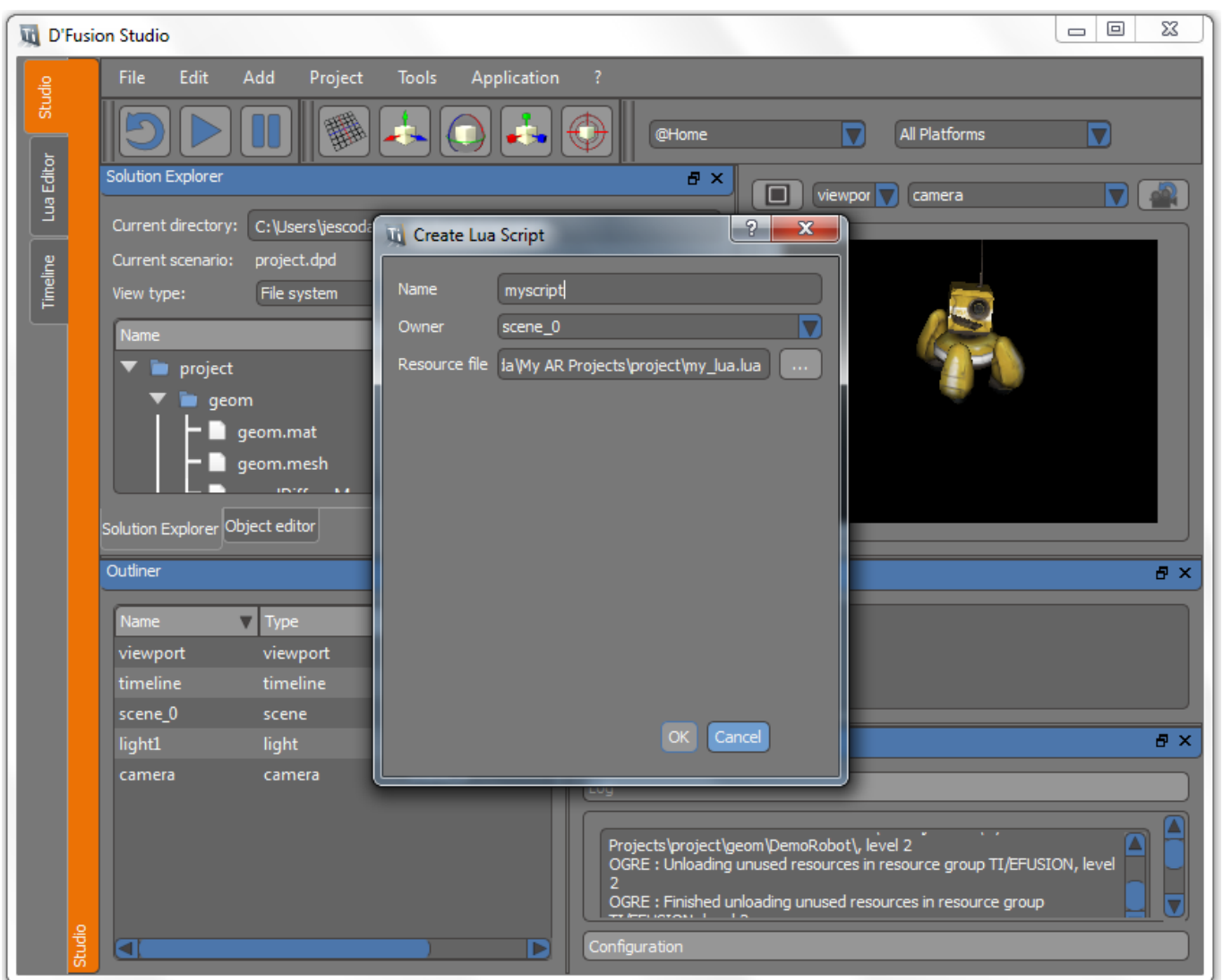


Drag parts of the manipulator with left mouse button to modify position, orientation or scale of your object.

Now that your 3D objects are correctly positioned, you may want to add some behavior to your scene by adding a script.

Select the *Add, Script* menu. As for importing object, a dialog box will pop-up to let you specify the script name and its resource. You don't directly specify a module like for an entity here, you choose the script owner, which may be any kind of object in your scene. You can either select an existing file which will be imported or give a new name which will create an empty script. In both cases, your file must be under the main project file directory.

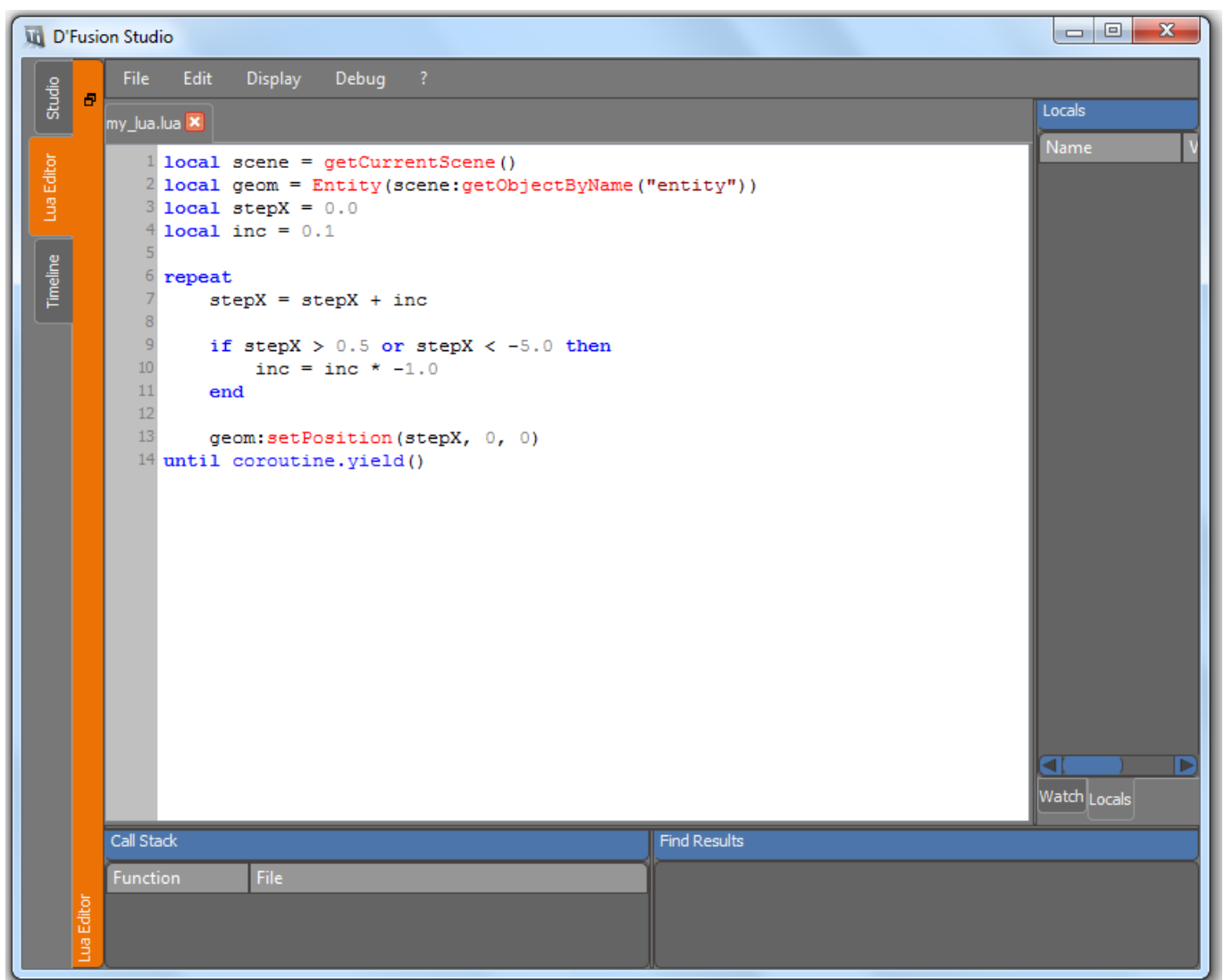
So create a new script and select scene_00 (this is default name of your scene) as owner.



Now select your script in the *Object Editor*, check the “trigger” option in order to execute the script as soon as the scene is played. Click the “Set initial values” button to be sure it will be saved.

Your script is actually empty. To you need to edit it to add some behavior. You can either click the “Open in Editor” button in the *Object Editor*, or right click in the outliner on your script and select the menu “Open in Lua Editor”. In both cases, it will open your script in Lua Editor and switch to this panel.

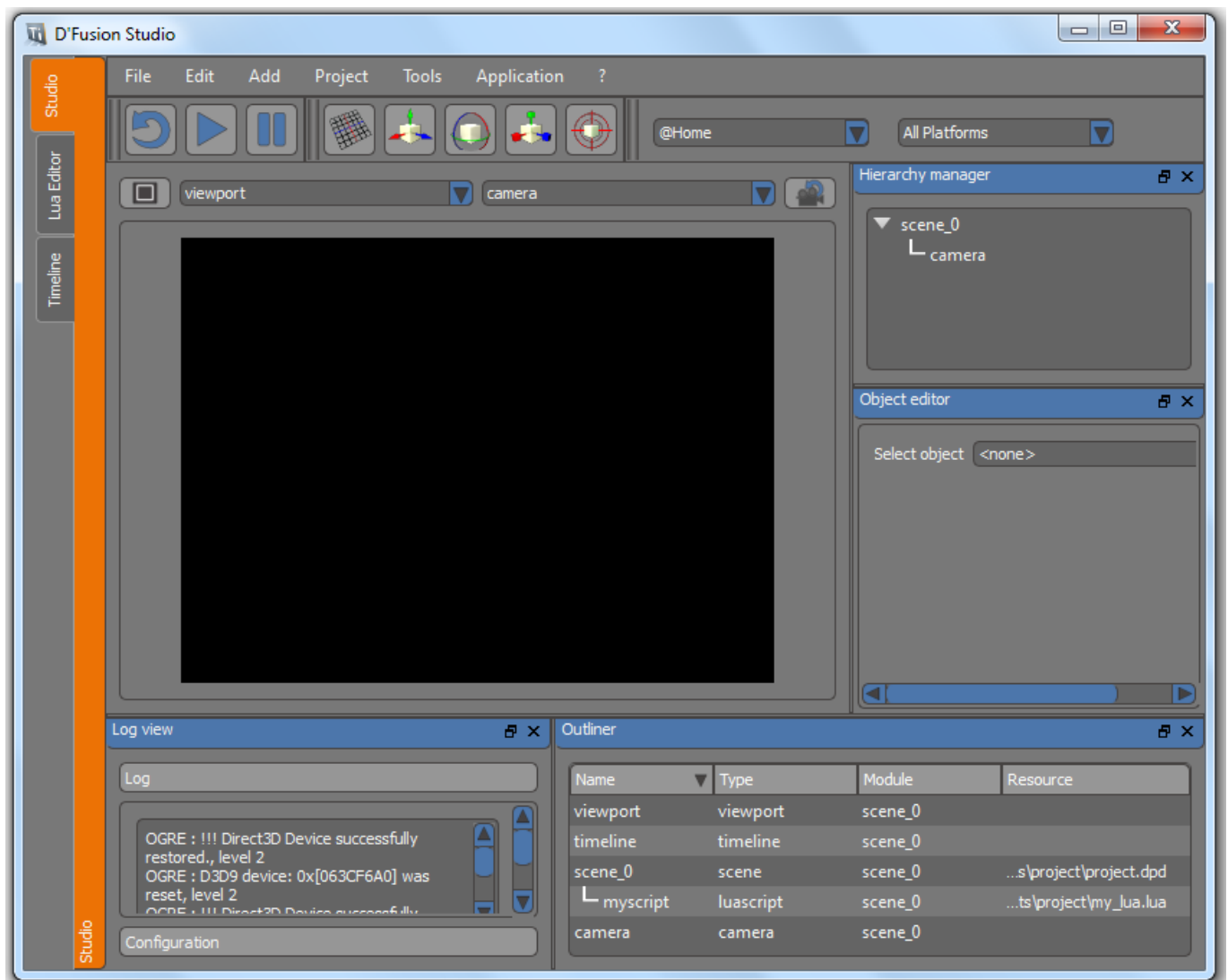
Enter some behavior and save your script.



Reset your scene to force reload of the script file.

Push the play button!

3. STUDIO PANEL



3.1 Menu

3.1.1 File

New	<i>Ctrl+N</i>	Create a new scenario project. A dialog is opened to save the new .dpd file.
Load	<i>Ctrl+O</i>	Load a project.
Save	<i>Ctrl+S</i>	Saves your project (overwrite the current .dpd file). All objects are reset to their initial values.
Save as	<i>Ctrl+Shift+S</i>	Save the current scene with a specified filename. All objects are reset to their initial values
Recent files		Lists the 4 latest opened files. Click on one element to open the corresponding scene.

Exit

Close the application

3.1.2 Edit

Undo*Ctrl+Z*

Undo the last modification in the Studio panel

Redo*Ctrl+Y*

Redo the last modification in the Studio panel.

3.1.3 Add

Add an ew object in your scene:

- 3D Elements:

All 3D elements are positioned at (0, 0, 0).

You can add:

- Empty 3D object**

A 3D node. This type of object has no associated resource file. It can be mainly used to group objects in the 3D hierarchy.

- Module**

An empty module

- Entity**

Imports a 3D Entity. You must select the corresponding .mesh file.

- Scenette**

Imports a scenette. You must select the corresponding .scene file.

- Rendering:

- Camera**

You can optionally specify a configuration file

- Viewport**

You must specify valid rendertarget and camera parameters

- Rendertexture**

Creates a new renderTexture.

- 2D Elements:

- Videocapture**

You can specify a video configuration file (.xml)

- Videotexture**

Creates a texture based on an existing video capture.

- Texture**

Import a 2D Texture. You must specify the input file.

- Text2D**

Creates a new 2D Text object.

- Overlay**

Imports an overlay object. You must specify the overlay template and the .overlay Ogre file.

- Effects:

- Light**

To add point, directional or spot light in your scene

- Particle**

Imports a particle system, you must specify the particle system name and the ".particle" Ogre file.

- Sound**

Imports a .wav or .ogg file

- Script:

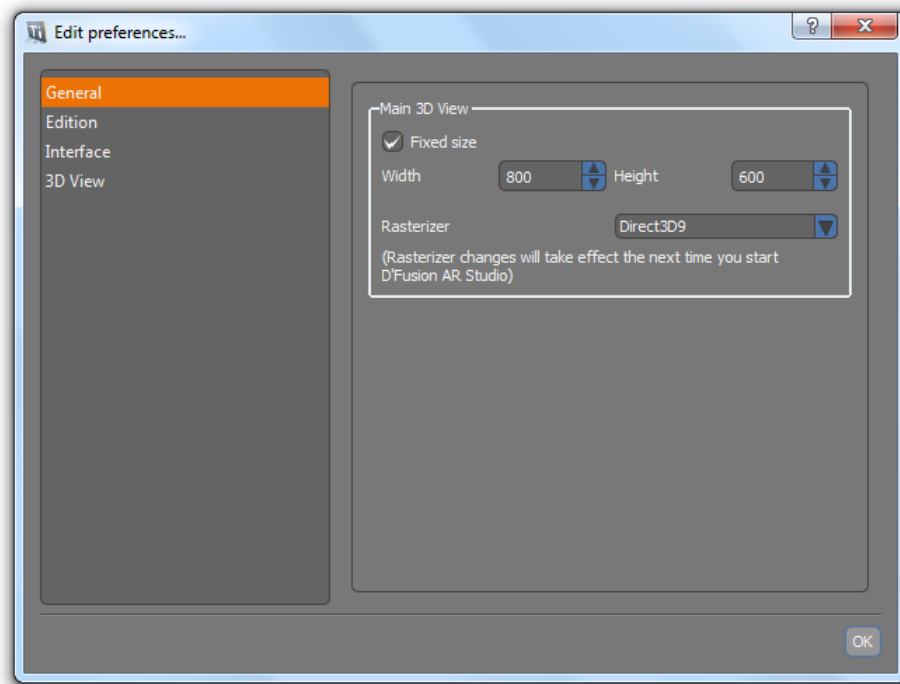
You can specify a .lua file.

3.1.4 Application

3.1.4.1 Preferences

Open preferences dialog

- General



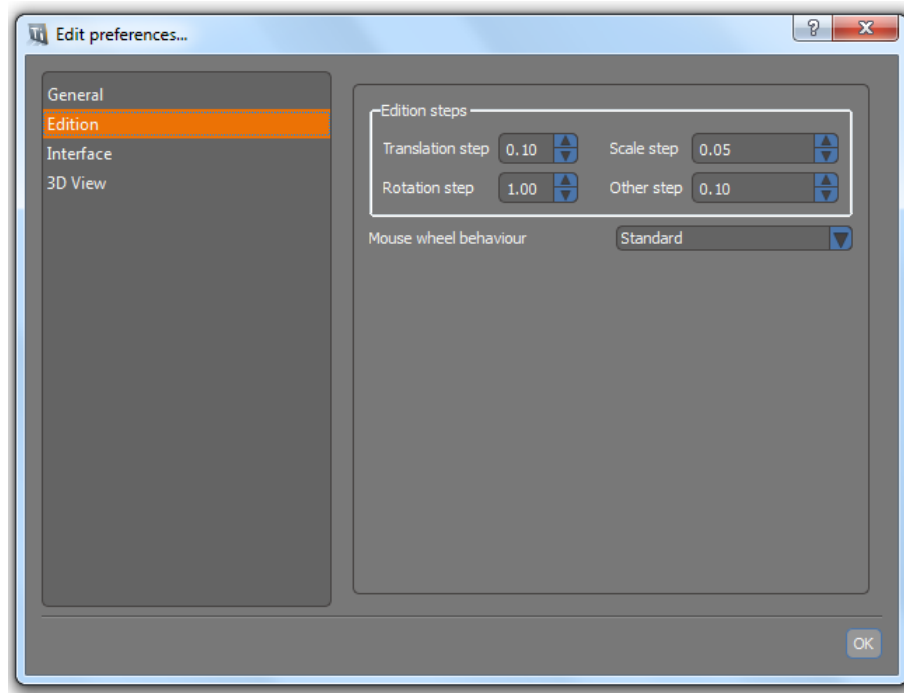
You can adjust the size of the main 3D View. This size is totally independent from final window size of your scenario.

If the "Fixed size" option is checked, the 3D view has exactly the size defined in this dialog and is not scalable.

If the "Fixed size" option is unchecked, the 3D View is scalable but keeps the ratio of your final application window (You can adjust the final application window's size in Project > Settings > Rendering)

The rasterizer option allows you to choose between Direct3D9, OpenGL and OpenGL ES 2 for the render. For this option, changes will take effects the next time you start D'Fusion Studio.

- Edition



You can adjust the edition steps of several types of spin boxes here.

Wheel mouse behavior: You can choose among three behaviors for the mouse wheel:

Standard

The mouse wheel changes value of spinbox as soon as mouse cursor is above the spinbox

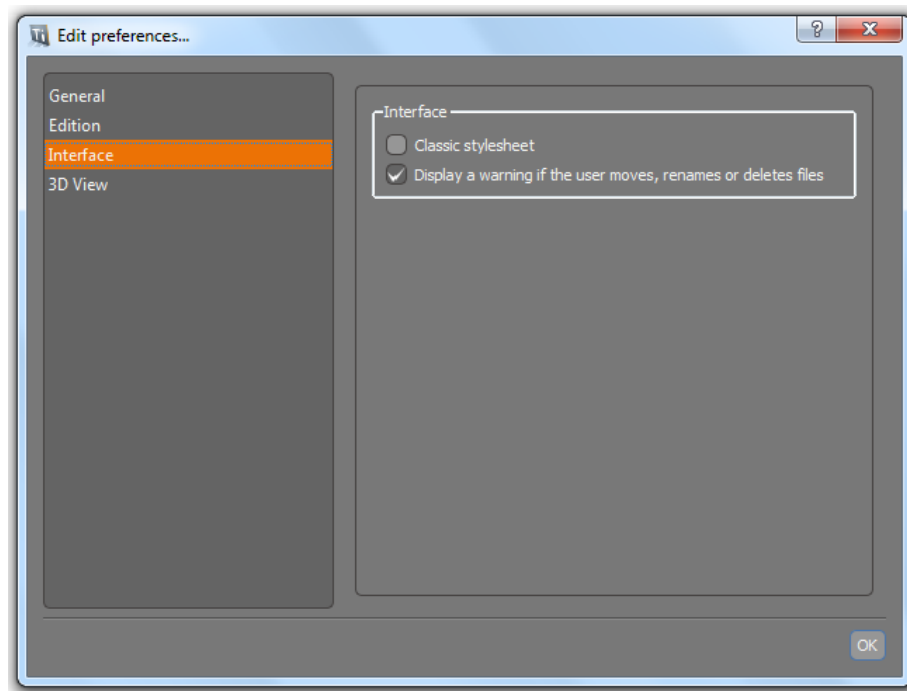
Ignore wheel

The mouse wheel never changes values of spinbox

Edit with wheel and Ctrl

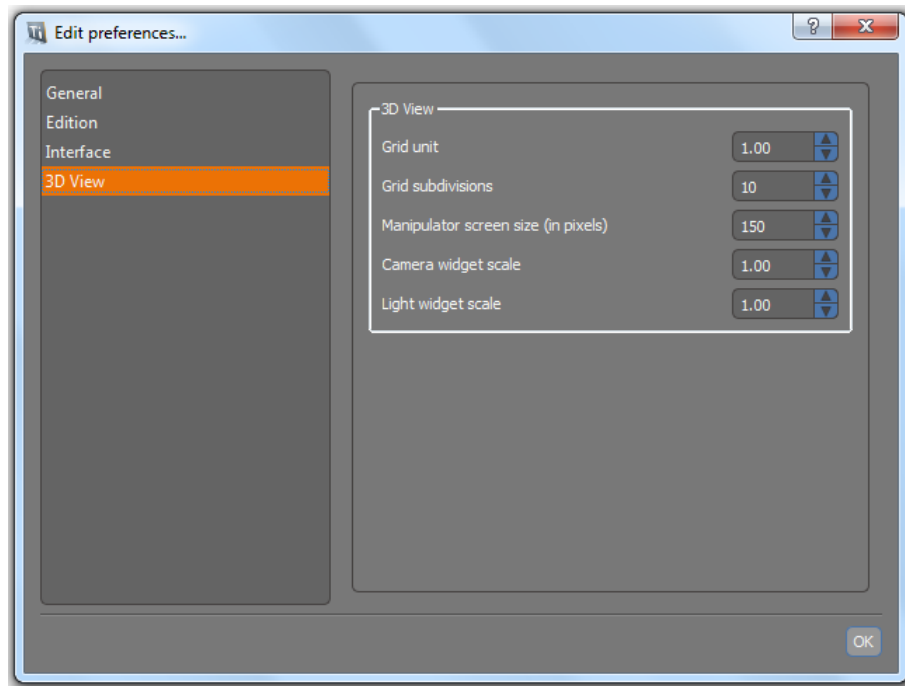
The mouse wheel changes value of spinbox if you click on the spinbox and press Ctrl Key

- Interface



You can choose to apply the standard style to the application.

- 3D View



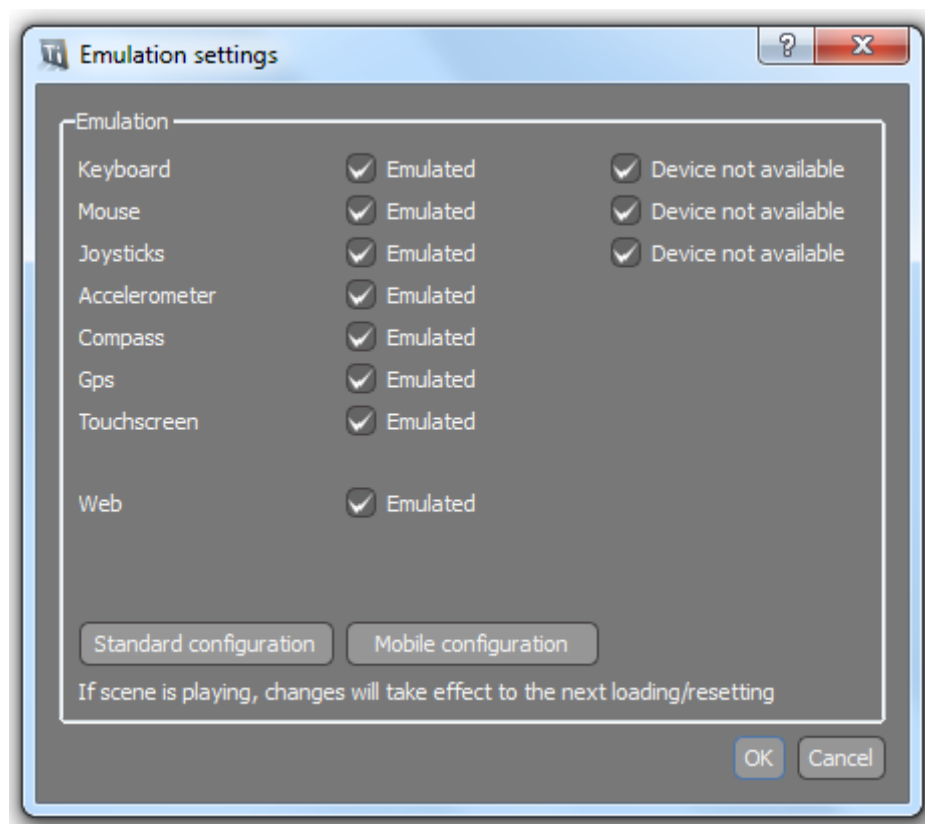
Grid unit	Unit of one subdivision of the grid (in Ogre unity)
Grid subdivisions	Number of subdivisions. A value of 10 will create a 10x10 square grid.
Manipulator screen size	3D manipulators (translation, rotation, scale) have constant screen size. You can adjust this size (in pixels) here
Camera widget scale	A selected camera is represented by a special object in the 3D view. You can adjust the size of the camera object
Light widget scale	A selected light is represented by a special object in the 3D view. You can adjust the size of the light object

3.1.4.2 Windows

The Windows menu allows you to show/hide specific windows. A check symbol means that the window is visible.

3.1.4.3 Emulation Settings

Open a dialog for emulation settings. If the scenario is developed for a mobile platform, this dialog can be useful to configure the behaviour of some hardware devices.

**Emulated**

Device is emulated. If you emulate keyboard (or mouse/joystick) and use it physically (press a key), values are not caught by D'Fusion. Use the macro manager to configure values sent by emulated devices.

Device not available

The device will not be available in Lua script.

Standard configuration

Keyboard, mouse and joysticks are not emulated. Accelerometer, compass, gps and touchscreen are not available.

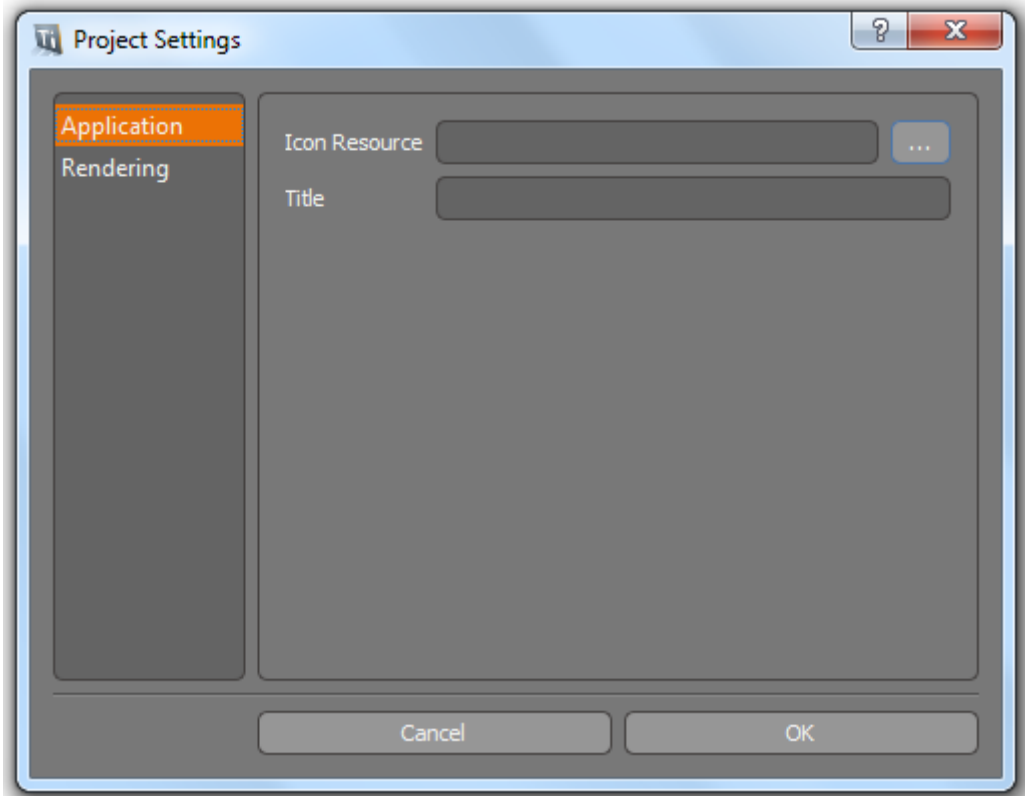
Mobile configuration

Accelerometer, compass, gps and touchscreen are emulated. Keyboard, mouse and joysticks are emulated and not available.

3.1.5 Project Settings

These settings are the settings saved with your current project. Depending on the context of your application (in Studio, in a Standalone player, or in a web player) these settings will not always have the same role. See related documentation for more information.

- Application



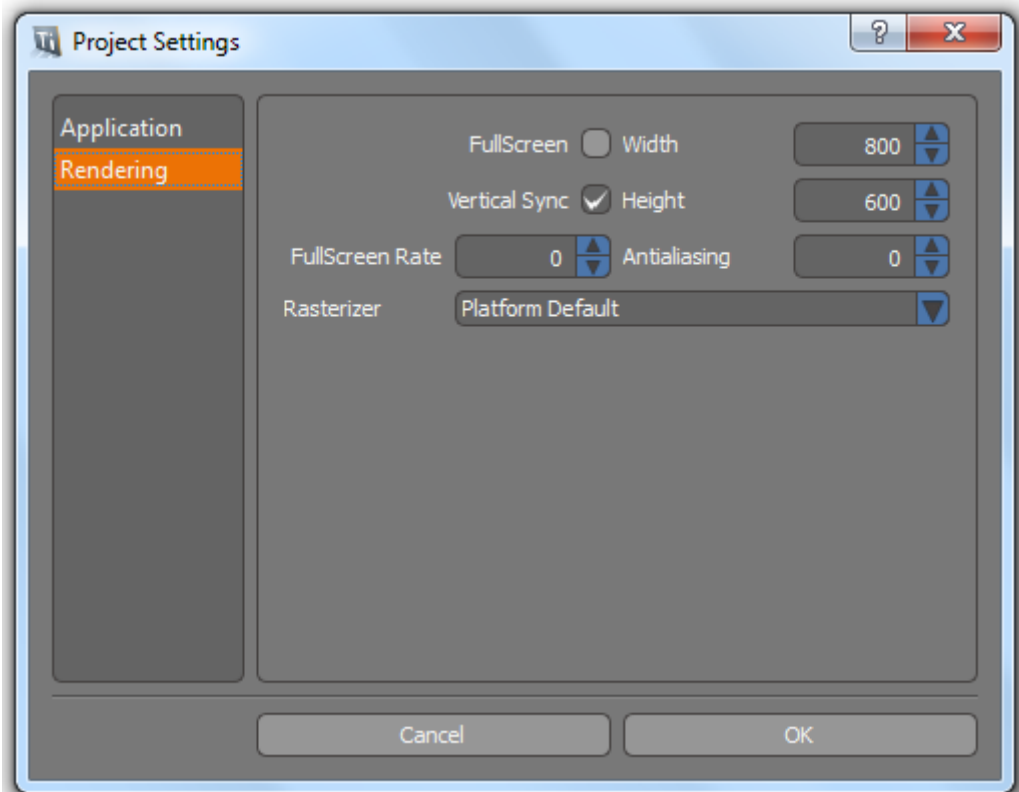
Icon resource

This parameter lets you specify a customized icon for the final application. The icon must be a valid image file (.ico for example). This setting only have an impact in a Standalone player

Title

Specifies the Title of the Standalone player main window. It has no effect in any other cases.

- Rendering



Fullscreen	Check this option if you want your scene to start fullscreen. This setting is always efficient in the scene configuration.
Vertical sync	This value controls the vertical synchronization of rendering operations. True by default
FullScreenRate	Full screen refresh rate. Usually set to 0 (unspecified).
Width	Controls width of the desired resolution for the final application main window.
Height	Controls height of the desired resolution for the final application main window.
Antialiasing	This parameter controls the desired antialiasing value for the final application.
Rasterizer	This value controls the renderer used by our graphic engine. As for today, two renderers are available: direct3D9, OpenGL and OpenGL ES 2. You can also choose "Platform Default" (recommended) as the default renderer may be different depending on the platform.

3.1.6 Export

Configure and export your scenario. For more information on the export process, please see chapter 3.11 "Export" of the current document.

3.2 Toolbar

3.2.1 Scene toolbar



Play/resume scene. Object's values are not updated at each frame.

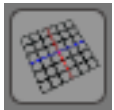


Pause scene. Objects created dynamically (in scripts) are displayed in the user interface.



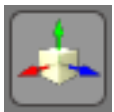
Reset all objects with their initial values

3.2.2 3D view toolbar



G

Display a XZ grid. The aspect of this grid can be configured in the preferences dialog



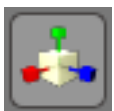
T

Display translation manipulator on the selected object.



R

Display rotation manipulator on the selected object.



S

Display scale manipulator on the selected object.

Only one transform is available at time.



C

Activate target mode. This mode is only available with lights and cameras and forces the selected object to look at the target widget.

3.2.3 Current target & platform



You can set the current target and platform. You can add or delete targets and platforms. Each target/platform can have different included files (defined in Solution Explorer).

3.3 Outliner

Outliner			
Name	Type	Module	Resource
scene_0	scene	scene_0	
└ myScript	luascript	scene_0	E:\Dev\Tests\test\myScript.lua
⚠ light	light	scene_0	
entity	entity	scene_0	E:\Dev\Tests\test\Geom\Geom.mesh
camera	camera	scene_0	

This panel lists all the objects of the scene. For each object, their type, their module and their resource file are also displayed.

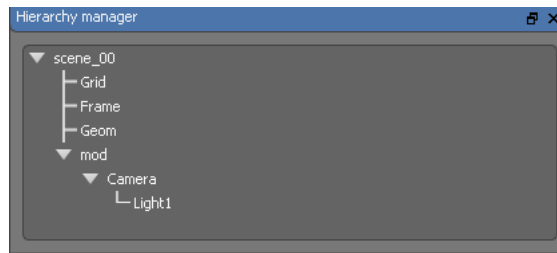
You can also visualize and modify script links with objects in this panel. If you want to modify the owner of a script, simply drag and drop the script to his new owner.

The warning icon appears if the object has been modified (by you or by the execution of a script). This icon stays until you click on the Object Editor "Set Initial Values" button for the selected object, or until you click on the main Studio "Reset" button.

You can activate a contextual menu by right clicking on any object:

Edit properties	Shows the object editor
Activate viewer	Only available for entity and scenette, open the 3D Viewer panel and display selected object.
Open in Lua editor	Only available for script objects; opens the script file in the <i>Lua Editor</i> and toggle to it.
Delete	Deletes current object. When you delete an object, all dependencies of this object will also be deleted (3D hierarchy for example).

3.4 Hierarchy manager



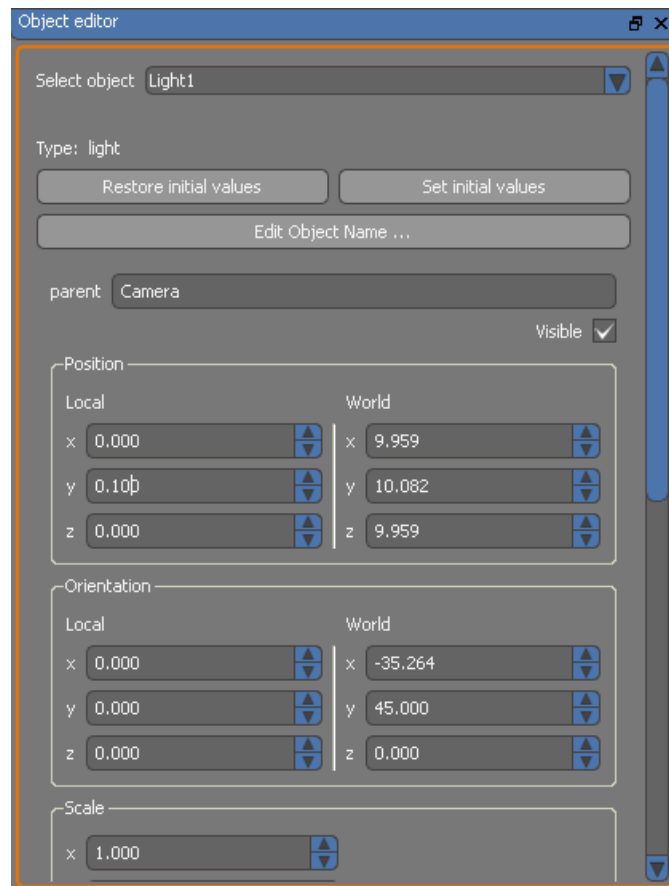
This view represents the 3D hierarchy of your scene. Only 3D objects appear in this view thus. You can modify the hierarchy here by drag and dropping the items. Notice that this will modify the initial values of the object whose hierarchy has been modified, and will be saved only if initial value is applied (in *Object Editor*)

You cannot move an object from a module to its parent module.

You can activate a contextual menu by right clicking on any object:

Activate viewer	Only available for entity and scenette, open the 3D Viewer panel and display selected object. If the selected object is a scenette, it disappears from the Studio panel and is displayed in the 3D Viewer . Scenette re-appears when the 3D Viewer panel is closed
Delete	Delete current object. Children are also deleted
Edit properties	Show the object editor

3.5 Object editor



In this panel, you can select and edit all the objects of your scene. Accessible parameters depend on the type of the selected object.

Initial values are values of all parameters at the load of the scene. When scene is saved all objects restore their initial values.

For example, a cube is positioned at (0, 0, 0). Scene is played, a script move the cube to (1, 0, 0). Then, scene is paused. (0, 0, 0) is the initial value of cube's position and (1, 0, 0) is its current value. When you reset the scene, cube recovers its initial values so its (0, 0, 0) initial position.

If an object is not in its initial state, panel's border color is orange.

Set initial value

Register current displayed values as initial values for the current object

Restore initial values

Restore initial values for the current object

Edit Object Name

You can change the name of the current object. Two objects cannot have same name

3.5.1 Object3D

Parent: scene_0

Visible ☒

Position

Local

x 0.000

y 0.000

z 0.000

World

x 0.000

y 0.000

z 0.000

Orientation

Local

x 0.000

y 0.000

z 0.000

World

x 0.000

y 0.000

z 0.000

Scale

x 1.000

y 1.000

z 1.000

☒ uniform

Visible

Let you specify if the object is rendered.

Position

The standard 3D position of an object. You can adjust the position in world or local coordinates.

Orientation

The standard 3D orientation of an object. You can adjust the orientation in world or local coordinates.

Scale

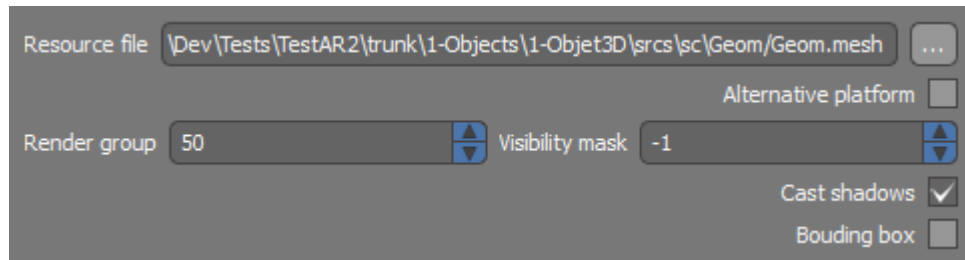
You can apply scales on your object.

Uniform

Force scale to be uniform. If you change scale of one axis, others axis are updated too.

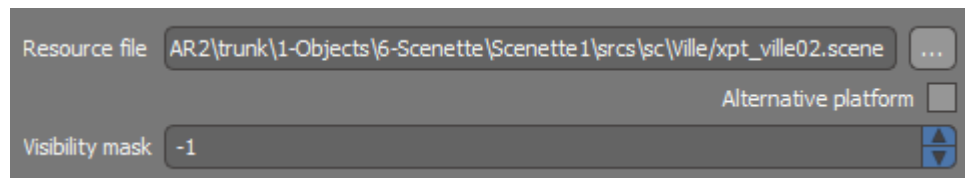
Be aware of Ogre behavior with non uniform scales, please refer to the media documentation. **REPHRASE, PLEASE!!**

3.5.2 Entity



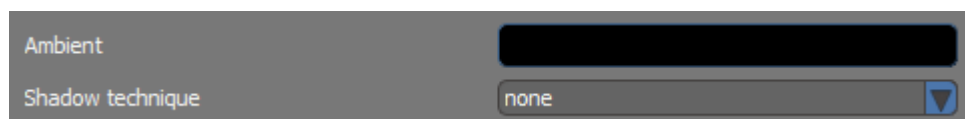
Resource file	The .mesh file used for this entity
Alternative platform	Let you define alternative .mesh file.
Render group	This is the rendering option that let you modify rendering priorities. Higher values are used for foreground object, lower values for background. Objects in the same group are of course rendered using the usual Z-Order sorting.
Visibility mask	Applies a visibility mask to this object.
Cast shadows	Let you specify that this object should cast a shadow.
Bouding box	Let you specify that the bounding box is displayed.

3.5.3 Scenette



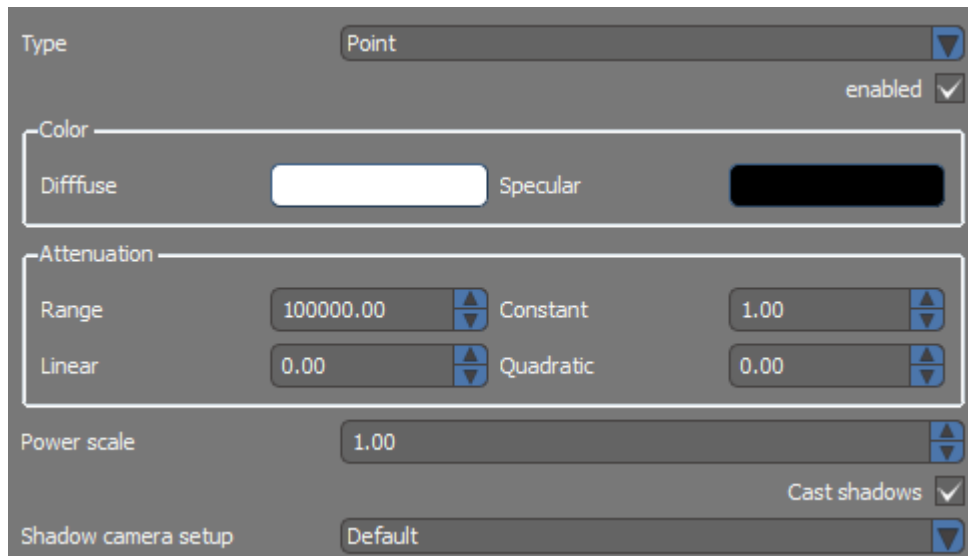
Resource file	The .scene used by this scenette.
Alternative platform	Let you define alternative .scene file.
Visibility mask	Applies a visibility mask to this object.

3.5.4 Scene



Ambient	Color of the ambient light
Shadow technique	Shadow technique used for the scene

3.5.5 Light



3.5.5.1 General parameters

Type	Depending of the type chosen, following parameters may apply or not.
Enabled	You can disable a light by deactivating this option.
Power scale	
Cast shadows	If this option is checked, shadows will be calculated from this light.
Shadow camera setup	When rendering texture shadows, you can specify a light to use a custom shadow camera with this setting.

3.5.5.2 Color

Diffuse	RGB values for the diffuse color.
Specular	RGB values for the specular color.

3.5.5.3 Attenuation

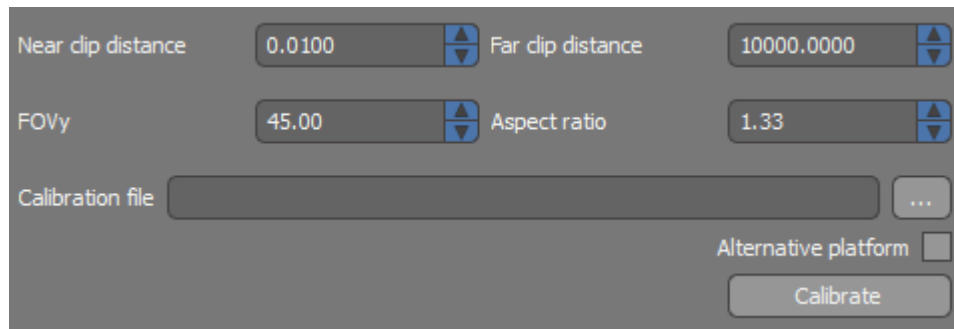
By default there is not attenuation on lights. You can however apply a standard attenuation computation on spot and point lights. (attenuation doesn't make sense on a directional light which position is not relevant).

Range	The upper range of the light
Constant	Constant attenuation factor
Linear	Linear attenuation factor
Quadratic	Quadratic attenuation factor

3.5.5.4 Spot

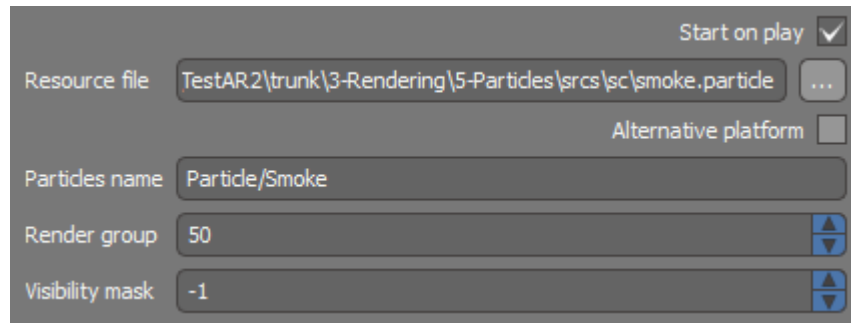
Inner range	It sets the angle covered by the spot inner cone.
Outer range	It sets the angle covered by the spot outer cone.
Fallof	It sets the falloff between inner and outer cone of the spot light.

3.5.6 Camera



Near clip distance	The near clip of a camera is the distance under which object will not be rendered.
Far clip distance	The far clip of a camera is the distance under which object will not be rendered.
FOVy	Let you override the Field Of View y angle (in radians) of the camera. Be aware that this setting is constrained by the model of the camera if specified. If you set this parameter, it will thus override the model value.
Aspect ratio	Let you override the aspect ratio of the camera. Be aware that this setting is constrained by the model of the camera if specified. If you set this parameter, it will thus override the model value.
Calibration file	The file parameter, as derived from Object, is used in Camera to set the model of the camera. Models are XML files, with important information used to configure the rendering made from this camera so that virtual object and real world match perfectly when a live stream is used as background input.
Alternative platform	Let you define alternative calibration files.
Calibrate	Open the (camera) Calibration panel.

3.5.7 Particles



Start on play ☒

Resource file ...

Alternative platform ☐

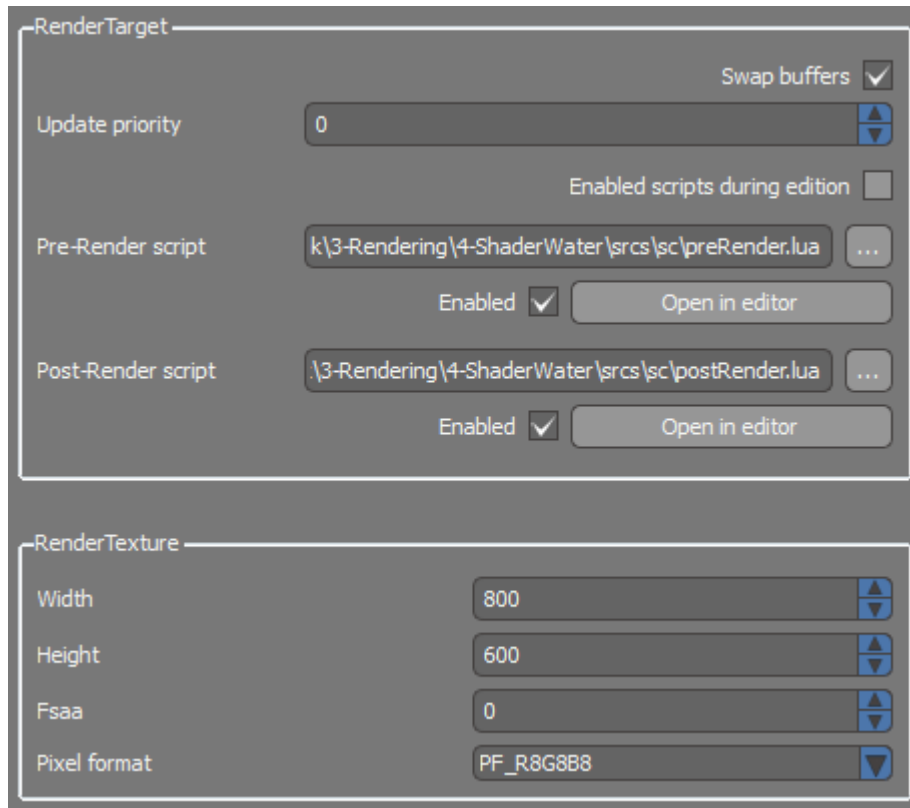
Particles name

Render group ▲ ▼

Visibility mask ▲ ▼

Start on play	Set this parameter to true if you want the particles to play when the scenario is launched.
Resource file	Refers to particles resource .particle file.
Alternative platform	Let you define alternative .particle file.
Particles name	The name of the particle system in the .particle file.
Render group	This is the rendering option that let you modify rendering priorities. Higher values are used for foreground object, lower values for background. Object in the same group are of course rendered using the usual Z-order sorting.
Visibility mask	Applies a visibility mask to this object.

3.5.8 RenderTexture

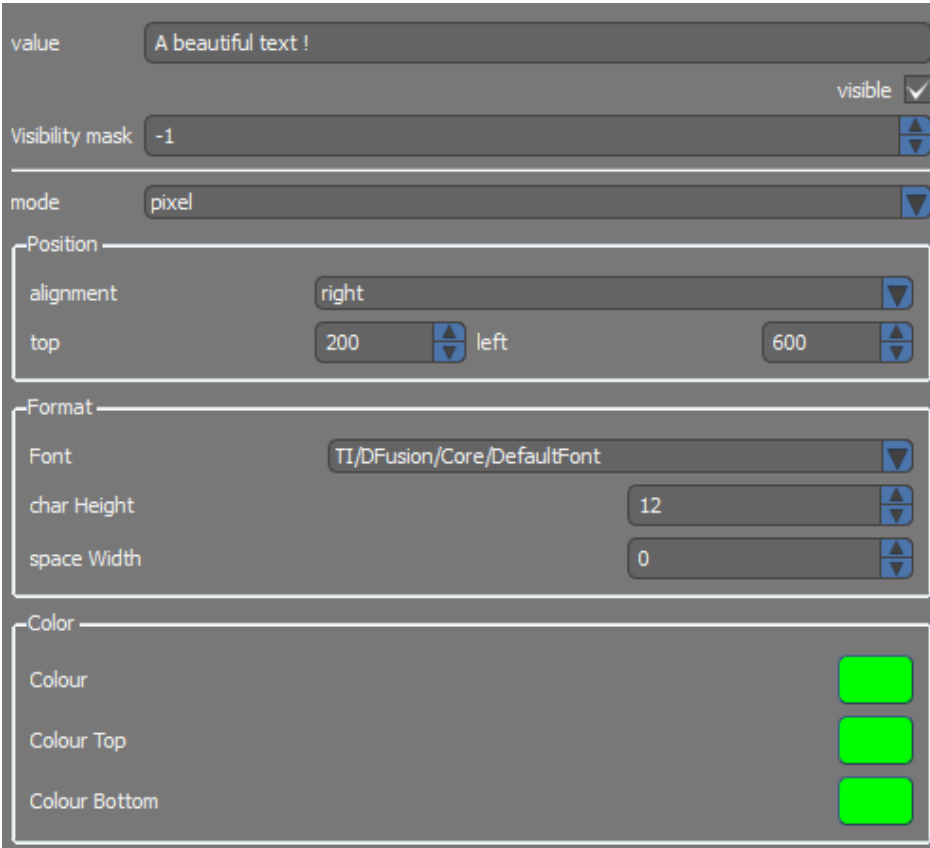


Update priority	Let you specify a priority which indicates in which order all the custom render targets will be rendered, which might be necessary if some use the result of some others.
Enabled scripts during edition	If the option is activated, pre and post render script are executed even if the scenario is not playing.
Pre-Render script	On rendering operations with different render target, you may need to customize your scene for each single operation differently. For this purpose, you can attach a script which will be called before the rendering of each single target with this parameter. The parameter must be the name of an existing script
Post-Render script	Like previous parameter, this let you customize your scene on rendering operation for each target. This script will be executed right after the rendering operation of the render target, generally to restore things modified by the pre-render script.
Width	Width of the texture.
Height	Height of the texture.
FSAAs	Level of multi-sample anti-aliasing used for this render texture.
Pixel format	Format used for the texture

3.5.9 Overlay

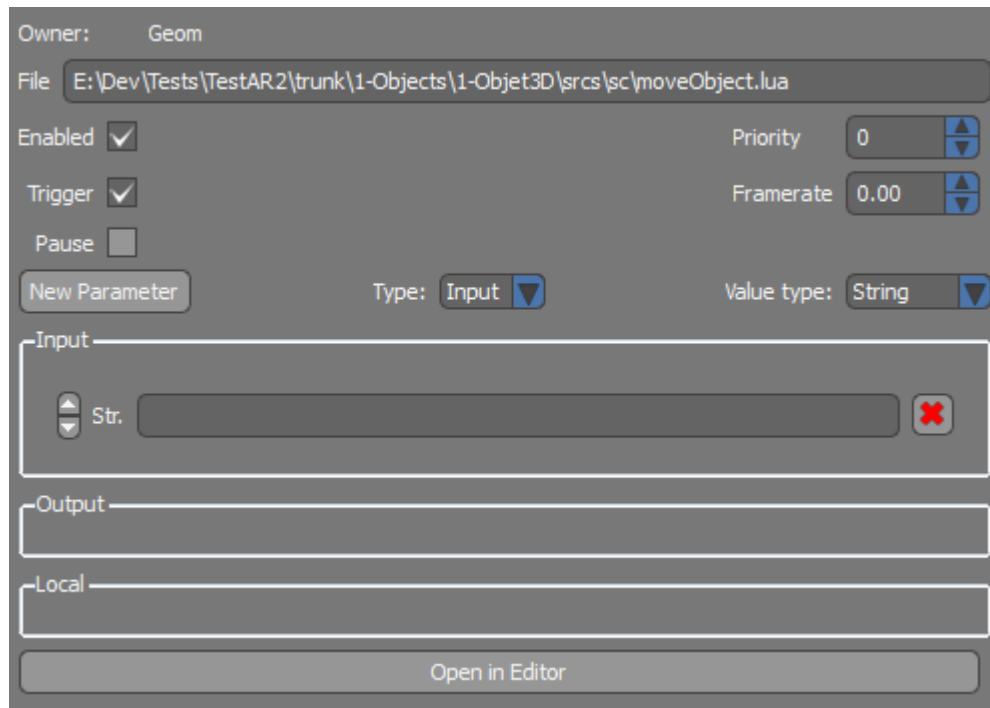
ScrollX	You can use this parameter to move the overlay. Values are in relative mode (left side of "screen" : 0, right side : 1)
ScrollY	You can use this parameter to move the overlay. Values are in relative mode (top of "screen": 0, bottom : 1)
ScaleX	You can use this parameter to scale the overlay. Scale's center is overlay's center.
ScaleY	You can use this parameter to scale the overlay. Scale's center is overlay's center.
Rotation	Rotation of the overlay in degrees. Rotation's center is overlay's center.
Visible	You can use this parameter to turn the overlay visible or invisible.
Z-Order	If you have several overlays, you can use this parameter to determine which one is displayed on top. Values between 0 and 650 are valid.
Visibility mask	Applies a visibility mask to this object.
Resource file	Reference to the resource file of this overlay. It must be a valid '.overlay' Ogre format file.
Alternative platform	Let you define a alternative .overlay file.
Overlay name	Name of the Overlay to instantiate in the '.overlay' file.
Is a copy	If you create two overlays or more, with the same file/overlayname combination and uncheck "is a copy" option, these overlays are linked (it means that if you scroll one overlay, the second is scrolled also)

3.5.10 Text2D



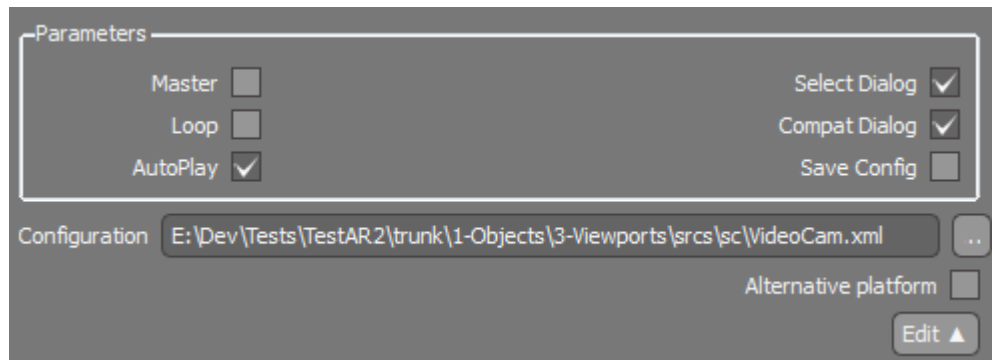
Value	Displayed text
Metrics Mode	Unit used for all numeric parameters. Possible values are 'relative' or 'pixel'. In relative mode, values are between 0.0 and 1.0. (left side of "screen" : 0, right side : 1)
Left	You can use this parameter to move the text on the screen. Values' unit depends on 'metricsmode' parameter.
Top	You can use this parameter to move the text on the screen. Values' unit depends on 'metricsmode' parameter.
Char height	Font's size. Values' unit depends on 'metricsmode' parameter. Values' unit depend on 'metricsmode' parameter
Spacewidth	Space between characters. Values' unit depend on 'metricsmode' parameter
Fontname	Font used for displaying text.
Colour	Text's colour.
Colour bottom	Color of the text's bottom part.
Colour top	Color of the text's top part.
Text alignment	You can use this parameter to align the text. Possible values are 'left', 'right' and 'center'.
Show	You can use this parameter to turn the text visible or invisible on startup.
Visibility mask	Applies a visibility mask to this object.

3.5.11 Script



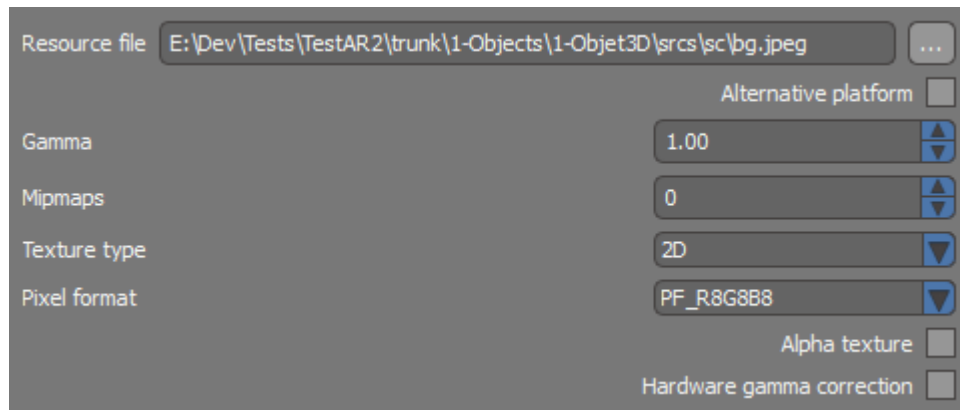
Enabled	If this parameter is set to false, the script will be disabled, preventing any execution before being re-enabled by the engine (via another script for example).
Priority	Priority manages order of execution of scripts.
Trigger	This parameter is a shortcut to force triggering execution of the script on launch of the scenario.
Framerate	<p>A script can stay active over time in D'Fusion engine, using the <code>yield()</code> function. In the default case, it will thus be executed once for each frame. In some cases, the user might want the script to be executed at a lower framerate. This parameter is a helper to simulate a delay between 2 executions of the script. If you give a framerate of 2 for example, eg you would like the script to be executed 2 times per second, once the script is executed it will be planned for execution after a delay of 0.5 seconds on the timeline, instead of being planned on the very next frame.</p> <p>With the management of timeline, the resulting real delay will always be equal or superior to this delay, resulting in a real framerate always inferior or equal. Notice this method is just a helper, and the framerate resulting might not be constant.</p>
Pause	This parameter is usefull only if the 'trigger' parameter is set to true. In this case, the script can be paused before being executed.
New parameter	If you click on this button, a new script parameter is created
Type	Type of the new parameter
Value type	Value type of the new parameter

3.5.12 Videocapture



Master	Specifies this capture is the Master of this scenario, meaning everything is synchronized to this input. There can be only one Master per scene.
Loop	Will make the video loop if the video is a file. This flag has no effect on a live capture
AutoPlay	Set this parameter to true if you want the videocapture to play when the scenario is launched.
Select dialog	This enables a selection dialog to pop up when the default configuration does not match a valid video input
Compact dialog	This flag modify appearance of the selection dialog. When checked, a compact dialog with minimum choices will show
Save config	When checked, this flag will cause the local configuration be saved. It can prevent the selection dialog to pop up on each launch
Configuration	Videocapture configuration file. (XML file)
Alternative platform	Let you define alternative videocapture configurations
Device	Let you select directly the camera amongst available devices
Num Driver	Let you select directly the drive of the requested capture device
VidCapID	?
Video Tool	Open the Video panel.

3.5.13 Texture



Resource file	Texture file
Alternative platform	Let you define alternative texture file
Gamma	Sets the gamma adjustment factor applied to this texture on loading the data.
Mipmaps	Sets the number of mipmaps to be used for this texture.
Texture type	Type of texture.
Pixel format	Format used for the texture:
Alpha texture	This parameter is used if a greyscale texture must be used as an alpha texture.
Hardware gamma correction	Sets whether this texture will be set up so that on sampling it, hardware gamma correction is applied. This option is only supported on recent hardware.

3.5.14 VideoTexture



Video capture	The parameter must be the name of an existing videocapture
---------------	--

3.5.15 Viewport

Camera: camera2

Target: <Main View>

Top: 0.00 Left: 0.50

Width: 0.50 Height: 0.50

Z-Order: 1

Visibility mask: -1

Scheme: Default

Enabled scripts during edition: ☐

Pre-Render script: ev\Tests\TestAR2\trunk\1-Objects\3-Viewports\srcs\sc\preVp2.lua

Enabled: ☒ Open in editor

Post-Render script: :v\Tests\TestAR2\trunk\1-Objects\3-Viewports\srcs\sc\postVp2.lua

Enabled: ☒ Open in editor

Background color: [Black] alpha: 1.00

Background texture: videoTex2

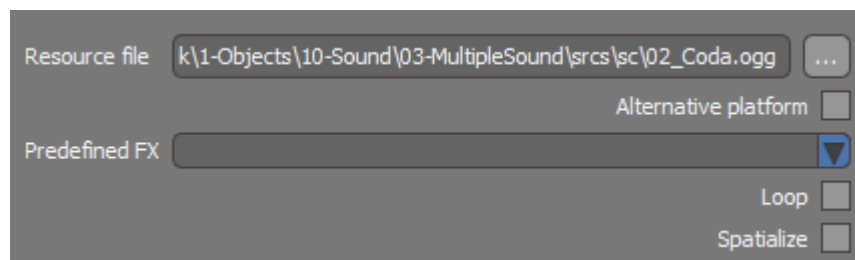
Texture top: 0.00 Texture left: 0.00

Texture width: 1.00 Texture height: 1.00

Camera	This field indicates with which camera the rendering will be made on this viewport.
Target	The render target of the viewport.
Top	Top of the viewport in the render Target, as relative value.
Left	Left of the viewport in the render Target, as relative value.
Width	Width of the viewport in the render Target, as relative value.
Height	Height of the viewport in the render Target, as relative value.
Z-Order	If you have several viewports, you can use this parameter to determine which one is displayed on top.
Visibility mask	Let you specify the visibility mask used by this viewport.
Scheme	The notion of scheme is used by Ogre render engine to modulate rendering for a single material depending on context. Please refer to Ogre documentation for more information.
Enabled scripts during edition	If the option is activated, pre and post render script are executed even if the scenario is not playing.
Pre-Render script	On rendering operations with different viewports, you may need to customize your scene for each single operation differently. For this purpose, you can attach a script which will be called before the rendering of each single viewport with this parameter. The

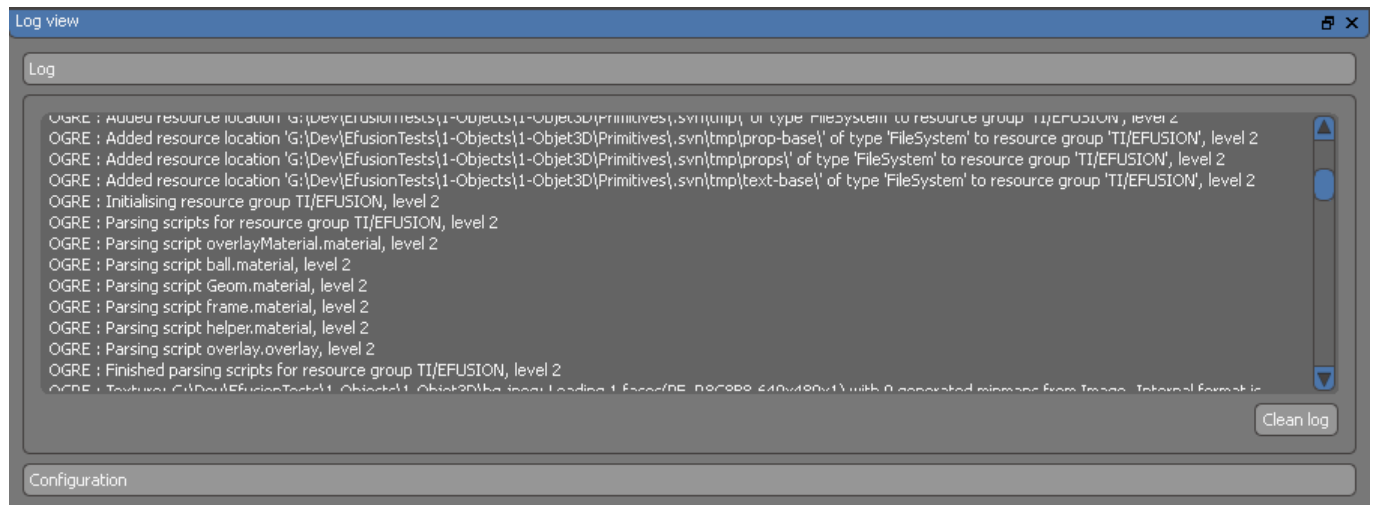
	parameter must be the name of an existing script
Post-Render script	Like previous parameter, this let you customize your scene on rendering operation for each target. This script will be executed right after the rendering operation of the render target, generally to restore things modified by the pre-render script.
Background color	Specifies the RGBA color value of the background.
Alpha	Specifies the RGBA color value of the background. This value has no influence
Background texture	Specifies the texture used as background.
Texture top	Top coordinate of the background as relative value.
Texture left	Left coordinate the background as relative value.
Texture width	Width of the background as relative value.
Texture height	Height of the background as relative value.

3.5.16 Sound

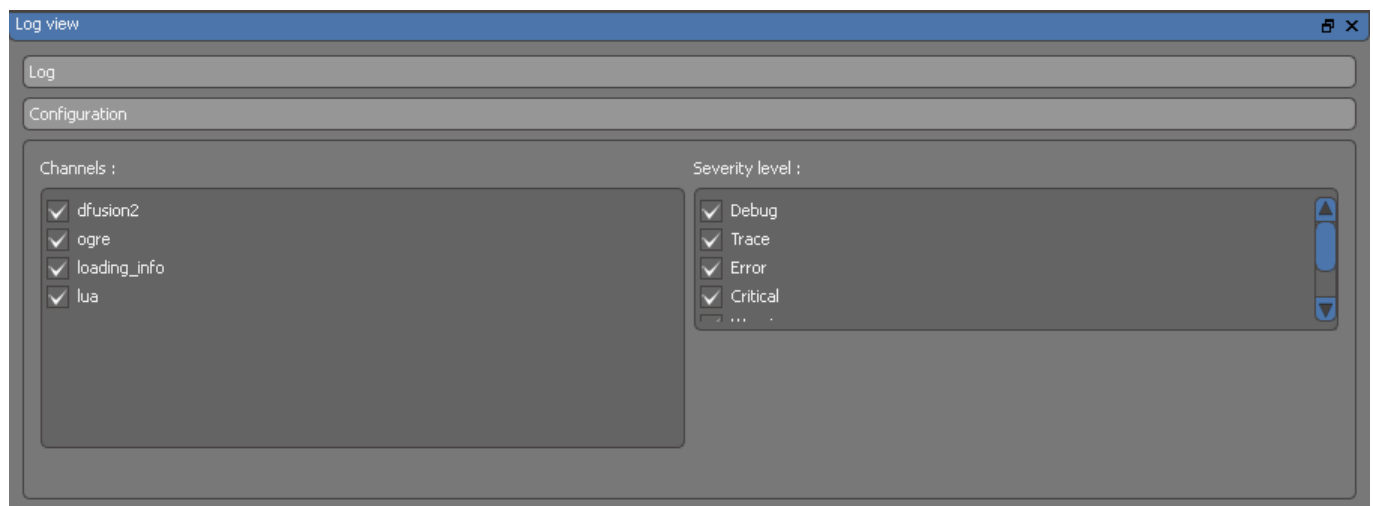


Resource file	Sound file
Spatialize	Lets you define if the sound is spatialized or not. When spatialized, the 3D position of the sound is used and the sound is adjusted related to the camera position and orientation.
Loop	Makes the sound loop.
Predefined FX	Specify an effect to apply to the sound among a set of predefined effects. These effects may include echo, distortion, etc. (but be aware that they may not all work on all platforms).

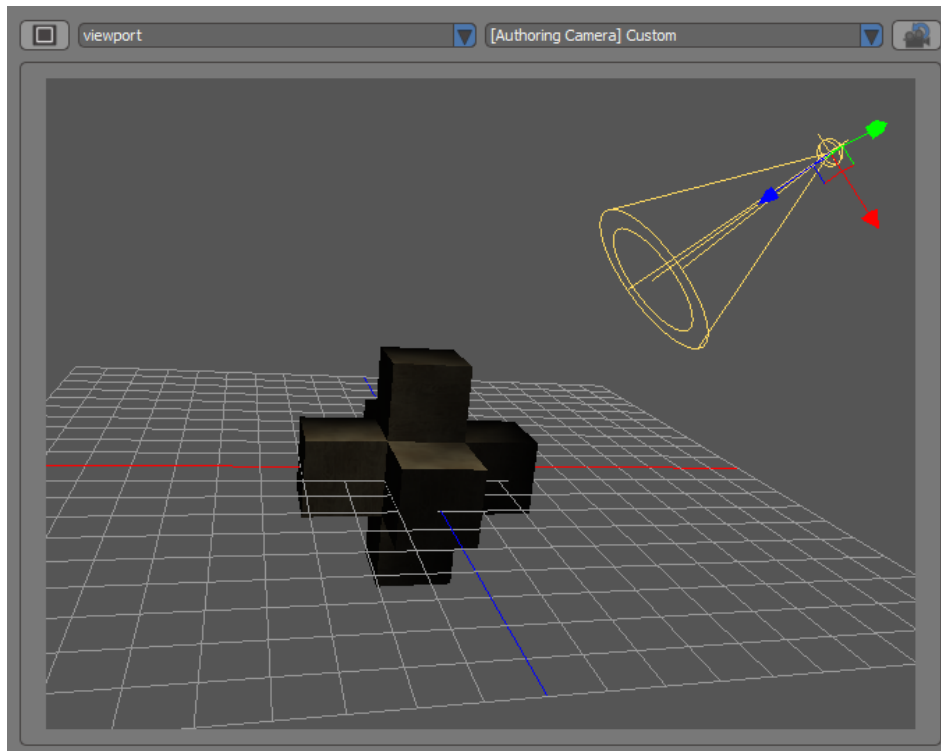
3.6 Log View



In the “log” tab of this panel, you can read all messages sent by D’Fusion. You can filter messages by channel and severity in the configuration tab.



3.7 3D View (viewport)



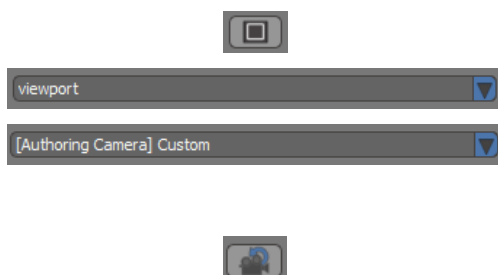
The 3D view allows the visualization of the scenario, and provides a set of tools to select and manipulate the 3D objects of the scene.

3.7.1 Visualization

For each viewport of your scene, a set of authoring cameras are available to help you visualize your scene or parts of it. These cameras are part of the authoring tool and will not appear in your saved scenario of course. Default points of view are Top, Bottom, Left, Right, Front, Back and Perspective. There is also a "custom camera" which is mainly useful to move around your scene without affecting your scene camera.

To move the current point of view, you can use actions below:

Traveling	Wheel mouse
Panning	<i>Alt</i> key + Middle button
Trackball	<i>Alt</i> key + Left button



Display a white rectangle on the current viewport

Select a viewport in order to modify the authoring camera

Select a camera for the current viewport. Select an authoring camera does not modify current viewport parameters

Reset authoring cameras to their initial position and orientation. No-authoring cameras are not reset

In the 3D view, cameras and lights have 3D representations to help you position them. This custom objects do not appear neither in your final scenario.

3.7.2 Select object

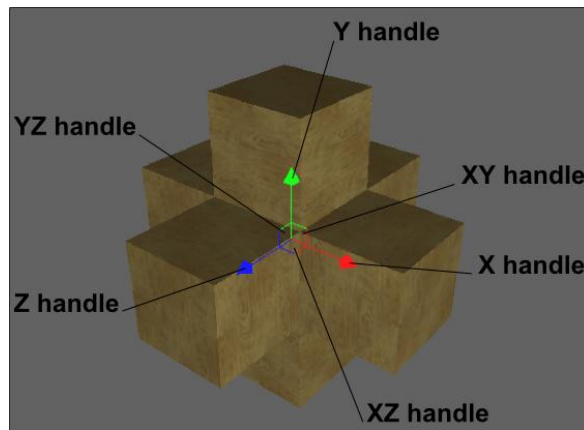
To select an object: Right click on the object in the 3D view.

3.7.3 Transform object

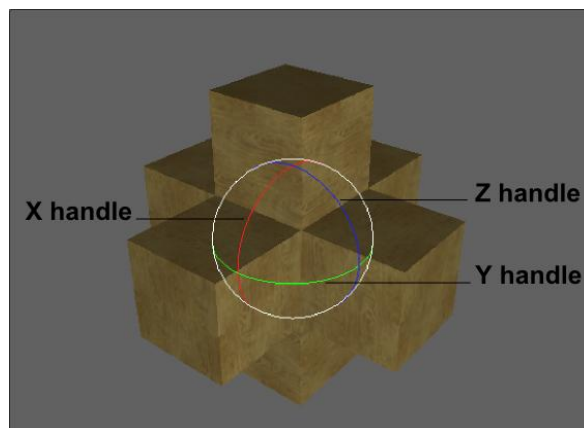
To transform an object:

- Activate one transform mode (translation, rotation, scale) in the toolbar
- In the 3D view, press left button and move the mouse to drag a part of the manipulator.
- If you want validate the transform, release left button (else right click to cancel the transform).

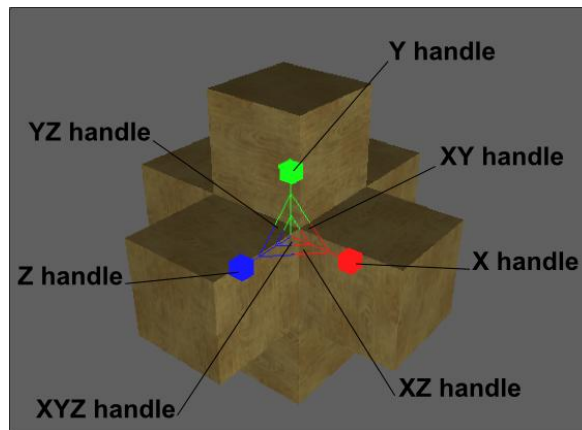
Translation manipulator:



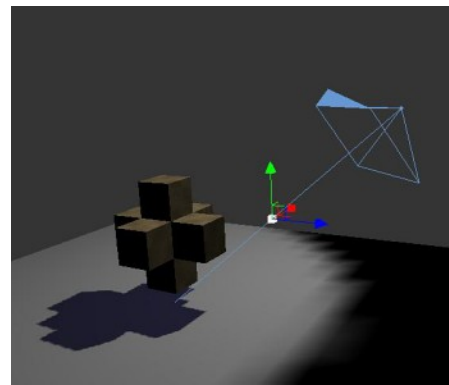
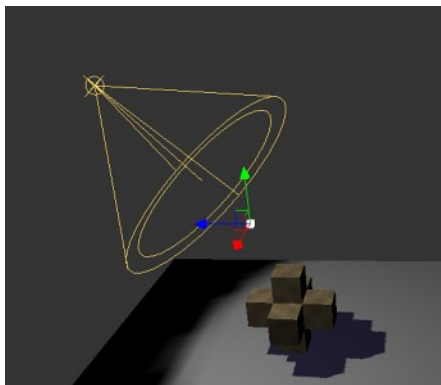
Rotation manipulator:



Scale manipulator:



For Light and camera objects, you can enter in "target mode" and move the target object without moving the camera or the light itself:



All these manipulations are strictly equivalent to changing the parameters value directly in the *Object Editor*. You also need to apply initial values then if you want values to be saved.

3.8 Macro manager

3.8.1 What is a macro?

It is a tool designed to facilitate the development of a scenario.

Macros are not part of the scenario and are not saved in the .dps file.

When a scenario is developed for a mobile platform, it can use devices such as accelerometer, compass, gps or touchscreen.

When authoring in D'Fusion Studio, these devices do not exist but can be emulated with the *Emulation settings* dialog.

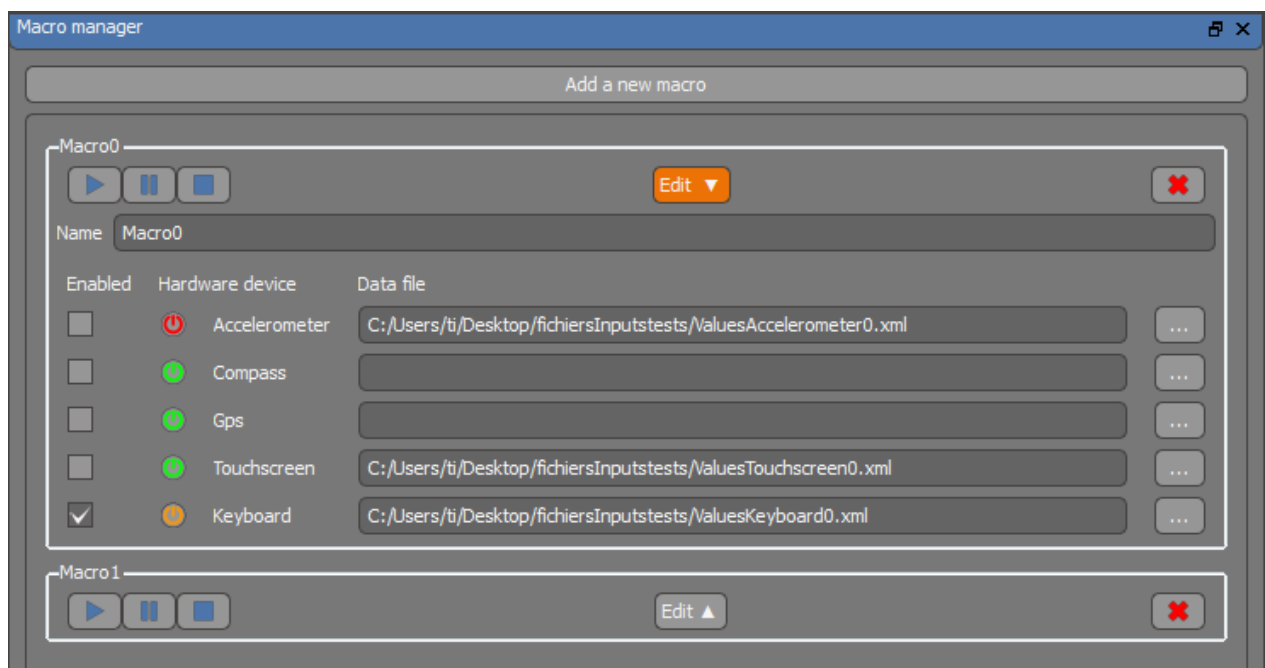
The macro will allow these emulated devices to return values.

3.8.2 Macro manager interface

Macro manager displays all macros used for the current scenario. When the scene is closed, all macros are deleted.

When scenario is saved, macros are saved.

Each macro widget can be collapsed with the "Edit macro content" button.



3.8.3 Macro interface



Play macro



Pause macro






Stop macro and reinitialize data



Delete macro

3.8.4 Macro element

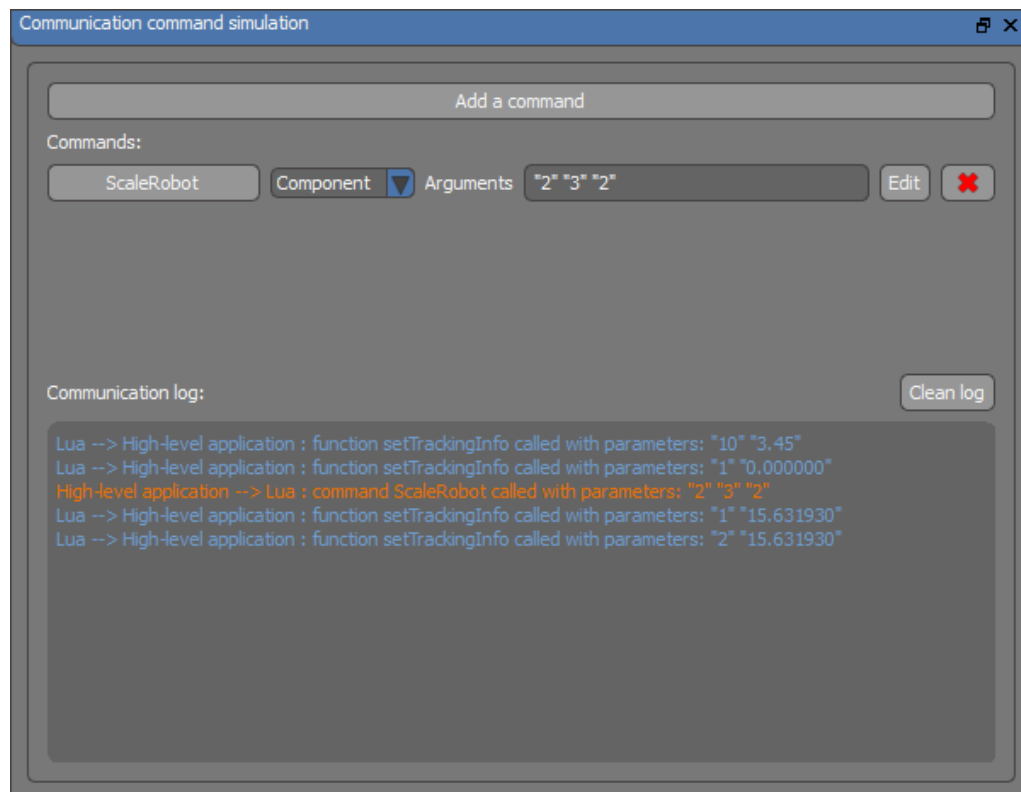
A macro is composed of several elements. Each element represents a device.

Enabled	Enable the macro element. When macro is playing, all enabled element are evaluated
Hardware device	Only values for this device are evaluated. The little icon represents the device status: <div><div>The device is available and emulated.</div><div>The device is present natively so the data file will be not evaluated or the device is emulated but disabled forced</div><div>The device is not available (the device is not present natively and its emulation is not activated)</div></div>
Data file	A xml file which contains values for the current device.

3.9 Communication command simulation

Communication command simulation is useful if your scenario communicates with a web page or high-level application (android/iphone).

You can simulate a command pushed by a web page or an application and the log view permits to visualize commands received and emitted by the Lua scripts.



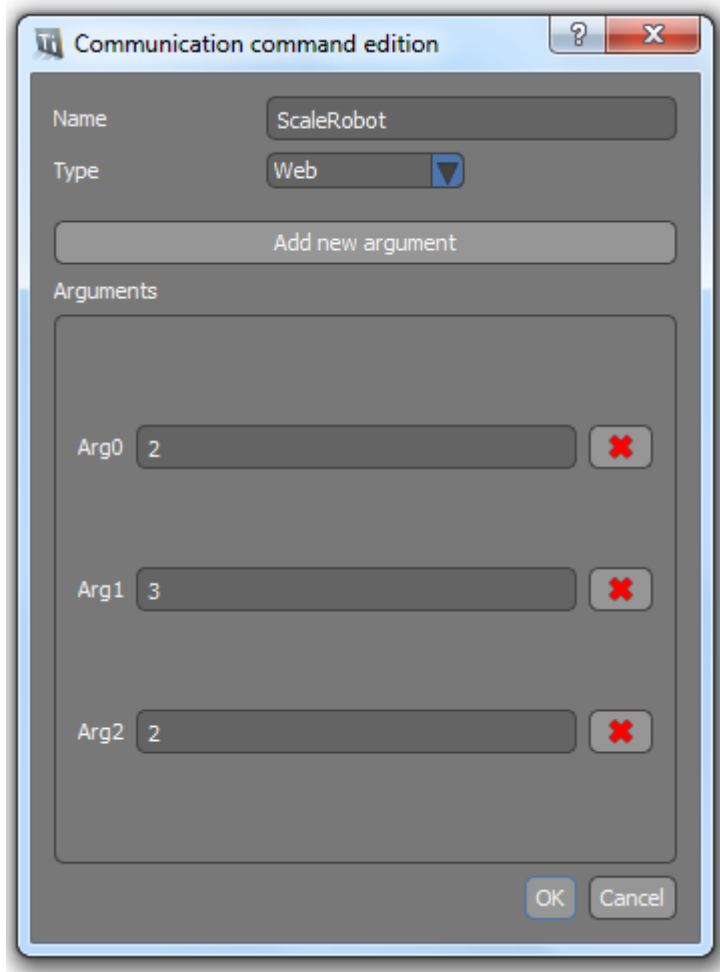
Add a command

Add a new command in the command manager

The panel "Communication command simulation" displays all commands used for the current scenario. When the scene is closed, all commands are deleted. When scenario is saved, commands are saved.

When you push the button marked with the command's name, the current command is enqueued in its interface (WebInterface or ComponentInterface) and could be received by Lua scripts.

You can open the command edition dialog with the Edit button:

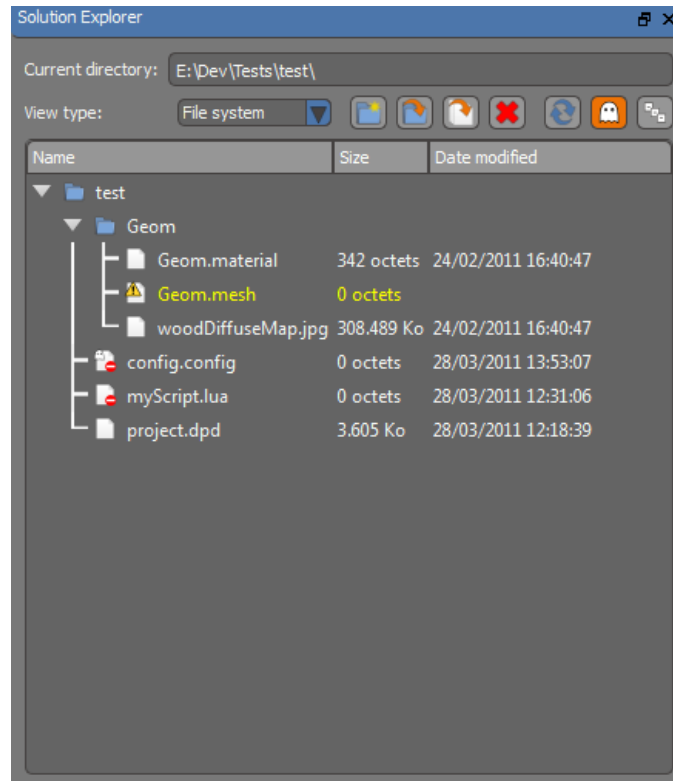


Name	Command's name
Type	Command's type. Indicate if the command is received in Lua by the ComponentInterface or the WebInterface
Add new argument	Add command's arguments

3.10 Solution explorer

The solution explorer window displays the contents of your project folder as a tree view. Three view modes are available: File System, Media and User.

3.10.1 File System



Create a new directory on the disk.



Import a directory in the current file hierarchy.



Import files in the current file hierarchy.



Delete current file/directory.



Refresh resource files.



Show/Hide hidden files.



Expand or collapse items.

Files can have different status :



Excluded file. This file is excluded from the export list of the current target/platform configuration.

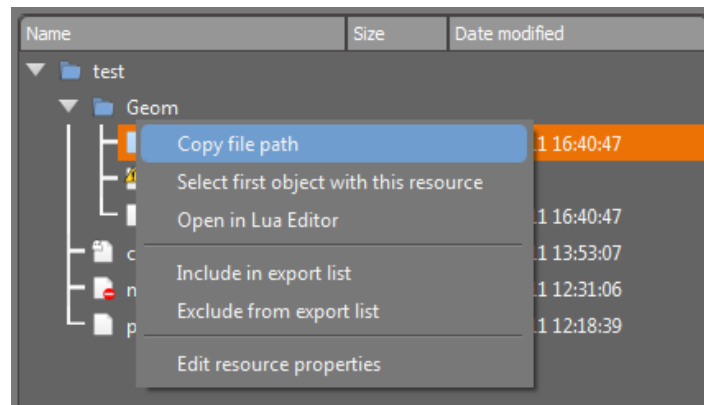


Missing file. This file is referenced in the export list of the current target/platform configuration but not present on the disk



Hidden file.

Several actions are allowed with right-click on items:



Copy file path

Copy the current file path in the clipboard

Select first object with this resource

Select an object in the scene which uses this resource file.

Open in Lua Editor

Open the current file in Lua Editor.

Include in export list

Include this file in the export list of the current target/platform configuration

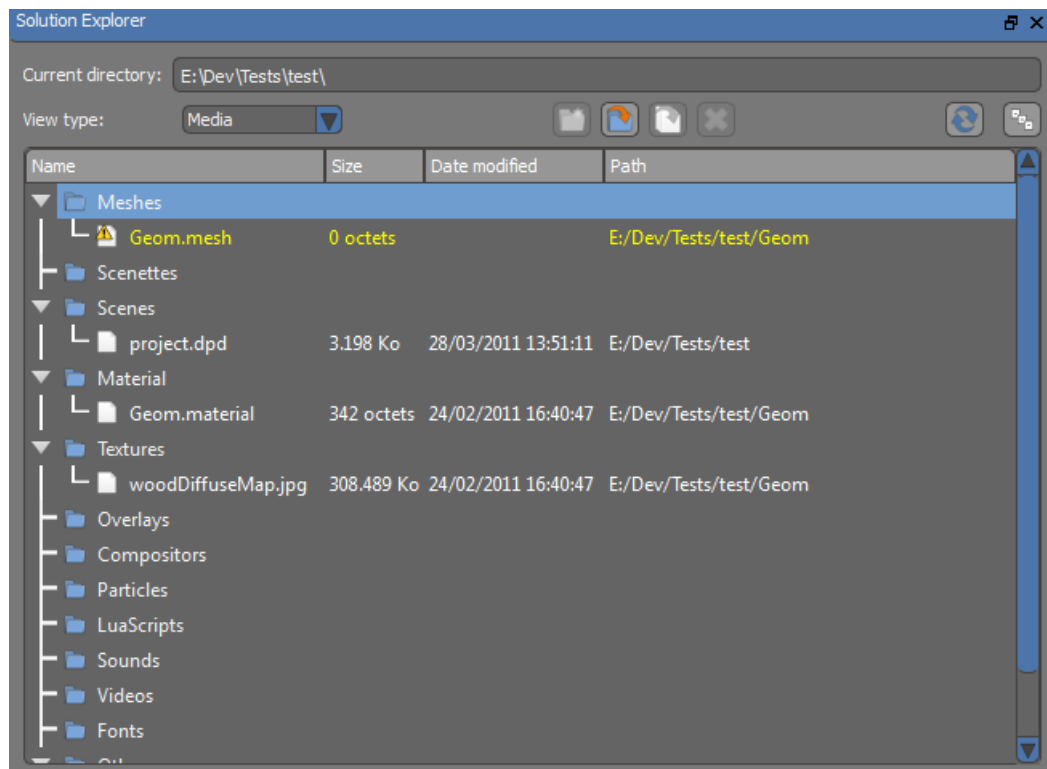
Exclude in export list

Exclude this file from the export list of the current target/platform configuration

Edit resource properties

Open a dialog to edit export options (compressed/encrypted...) for this file.

3.10.2 Media

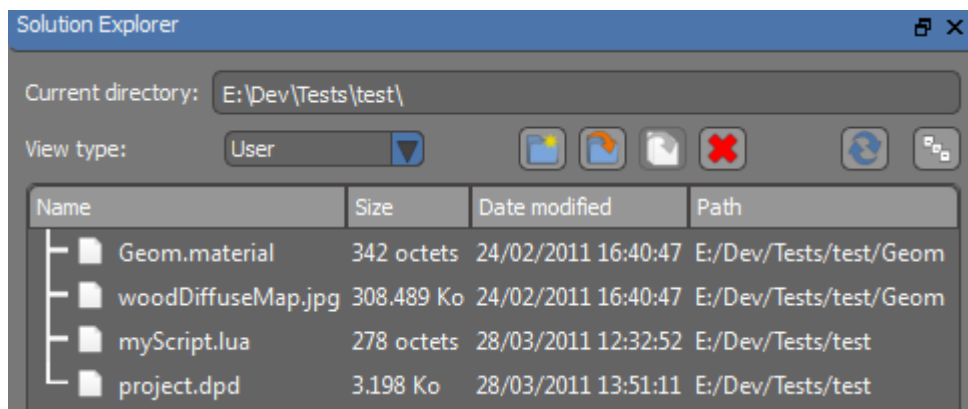


In this view, files are sorted by media types and only included files are displayed.

You can easily find if several items have identical filenames.

In the media view, the only authorized operation is to delete items. You cannot create directories or import files.

3.10.3 User



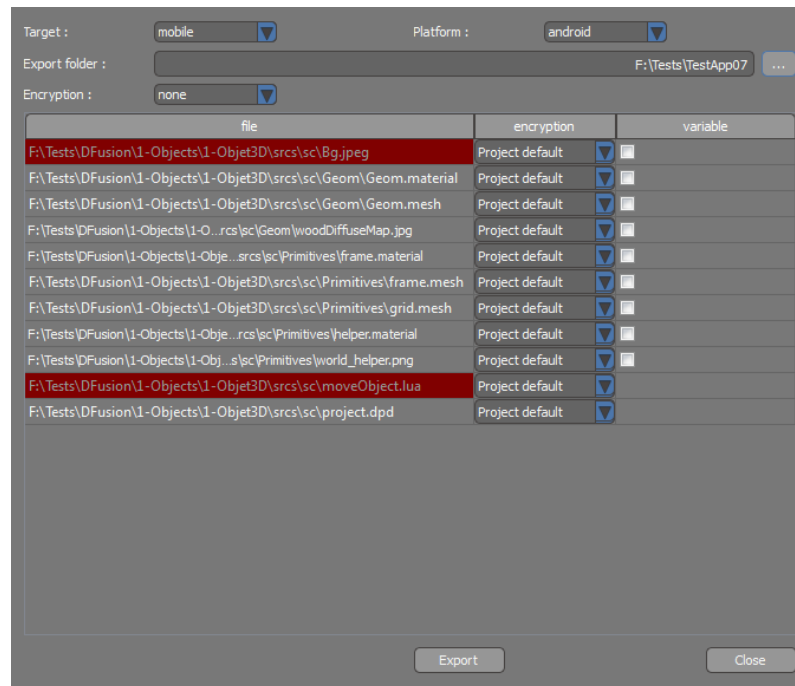
In this view, you can organize the files as you want. You can create new directories, move files into directories by drag'n'drop. Created directories are "virtuals", they don't exist on the disk and the file hierarchy represented in this view is purely virtual too. It doesn't make change on the disk.

However, if you delete a file, the file is physically deleted from the disk.

3.10.4 Drag'n'drop resource in 3D View to create new objects

If you drag'n'drop an item from the tree view to the 3D View, a new D'Fusion object is added to your scenario depending on the extension of the resource.

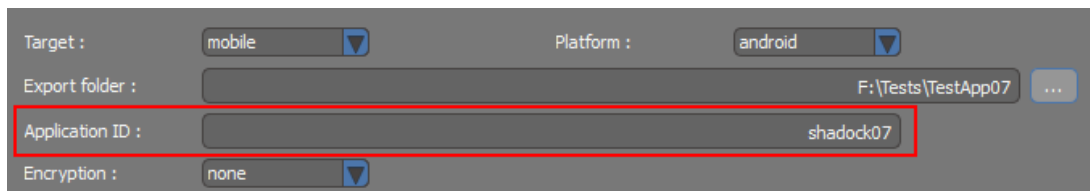
3.11 Export



Once your scenario is ready, you can export it. Export will make a copy of all files you defined as part of the scenario and will generate a Test Software Key. The export view, accessible through the menu Project > Export lets you configure important data for your scenario deployment.

The Export view shows you, for the selected target and platform, the list of files included in the project. If a file is missing, it is highlighted in dark red, but the export is still possible (a warning will remind you that you are exporting with some files missing).

For Mobile applications, this view also allows you to set application ID that will be saved in the test software key.



You can also choose the default encryption setting. Notice that this setting can be overridden independently for each file of the project.

The application ID and encryption setting are project settings, saved within your .dpd file.

For each target and platform you must also specify the folder where the project will be exported. Notice that this setting is considered more local to the environment development and thus not saved in the project file but in the workspace afferent file.

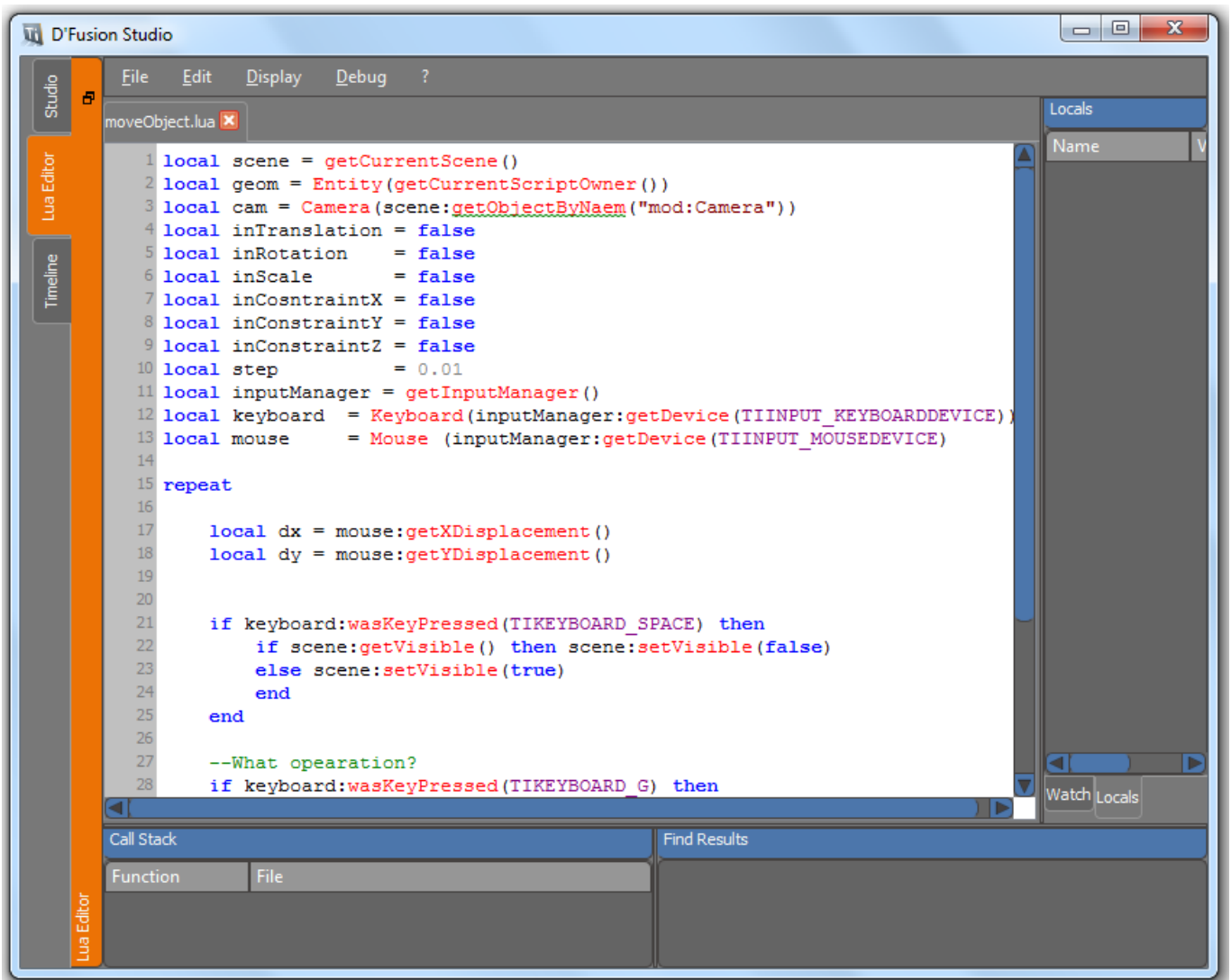
When the configuration of your project is ready, clicking export will process (eg copy and eventually encrypt or compress) every file of the scenario to the export folder, and create automatically the test software key. Once you have exported your scenario, you can test it in real conditions on your mobile phone using D'Fusion Mobile SDK or on your computer using a D'Fusion player.

To transform a "Test Software Key" (with Total Immersion tattoo) into a "Final Software key" (without Total Immersion tattoo), you need to purchase a D'Fusion Runtime license from Total Immersion.

4. LUA EDITOR PANEL

The Lua Editor is an advanced text editor in which you can visualize and modify the Lua scripts associated to the scene scripts. It features a multiple-documents interface, classic search and replace feature, bookmarks and syntax highlighting.

Besides it provides tools to debug the Lua scripts.



4.1 Menu

4.1.1 File

New	<i>Ctrl+N</i>	Create a new script, attach it to the scene, and set its Lua script
Save	<i>Ctrl+S</i>	Save the script currently being edited
Save all	<i>Ctrl+Shift+S</i>	Save all open lua scripts

4.1.2 Edit

Undo	<i>Ctrl+Z</i>	Undo your last modification in the script currently being edited
Redo	<i>Ctrl+Y</i>	Redo your last modification in the script currently being edited
Cut	<i>Ctrl+X</i>	Insert the current selected text in the clipboard and deletes it
Copy	<i>Ctrl+C</i>	Insert the currently selected text into the clipboard
Paste	<i>Ctrl+V</i>	Inserts the clipboard content at the position of the text editor cursor
Duplicate	<i>Ctrl+D</i>	Duplicate the currently selected text
Un/Comment	<i>Ctrl+Q</i>	Comment/Uncomment the currently selected text
Find	<i>Ctrl+F</i>	Show the Find dialog box
Replace	<i>Ctrl+H</i>	Show the Replace Dialog Box
Go To	<i>Ctrl+G</i>	Show the Go To Line Dialog Box

4.1.3 Display

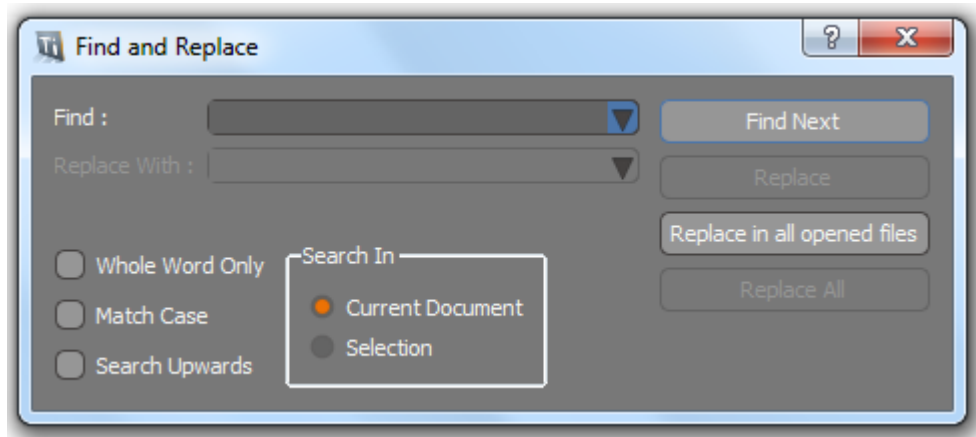
Switch view	<i>Alt+V</i>	Split view in two panels
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4.1.4 Debug

Add/Remove breakpoint	<i>F9</i>	Add/Remove a breakpoint on the current line
Toggle breakpoint	<i>Ctrl+F9</i>	Enable/disable a breakpoint on the current line
Run	<i>F5</i>	In break mode, resumes execution until next breakpoint
Step	<i>F10</i>	In break mode, executes current line of code and goes to next line
Step in	<i>F11</i>	In break mode on a line containing a function call, executes only the call itself and then halts at the first line of code inside the function
Step out	<i>Shift+F11</i>	Inside a function call, resumes execution of the current function until it returns, and then breaks at the return point in the calling function

4.2 Features

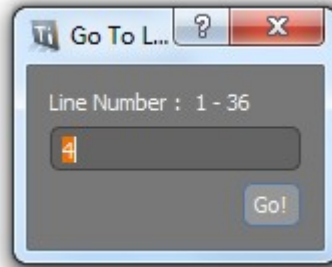
4.2.1 Find/Replace Dialog



The find/replace dialog allows to quickly locate and optionally replace iterations of a given text string.

Find	Text to search for in the current document
Replace With	Text which will be used to replace the found text iterations
Whole Word only	If checked, only complete words will be considered when searching for the specified text, otherwise the text can be found as part of a word
Match Case	Makes the search case-sensitive
Search Upwards	If checked, will browse the text upwards when looking for the next iteration of the specified text string
Search In	If current Document is specified, the search will browse the whole lua script for iterations of the searched string. If Selection is checked, the string will only be searched in the currently selected text
Find Next	Searches and selects the next iteration of the string
Replace	Replace the currently selected iteration of the searched string if any, and then select the next searched string iteration
Replace All	Replaces all the searched string iterations with the text specified in "Replace With"

When opening that dialog through the "Find" menu or the `Ctrl+F` shortcut, the "Replace With", "Replace" and "Replace All" fields will be disabled.



The "Go to" dialog, available from the Edit menu, allows to quickly jump to a specific line in the currently opened document.

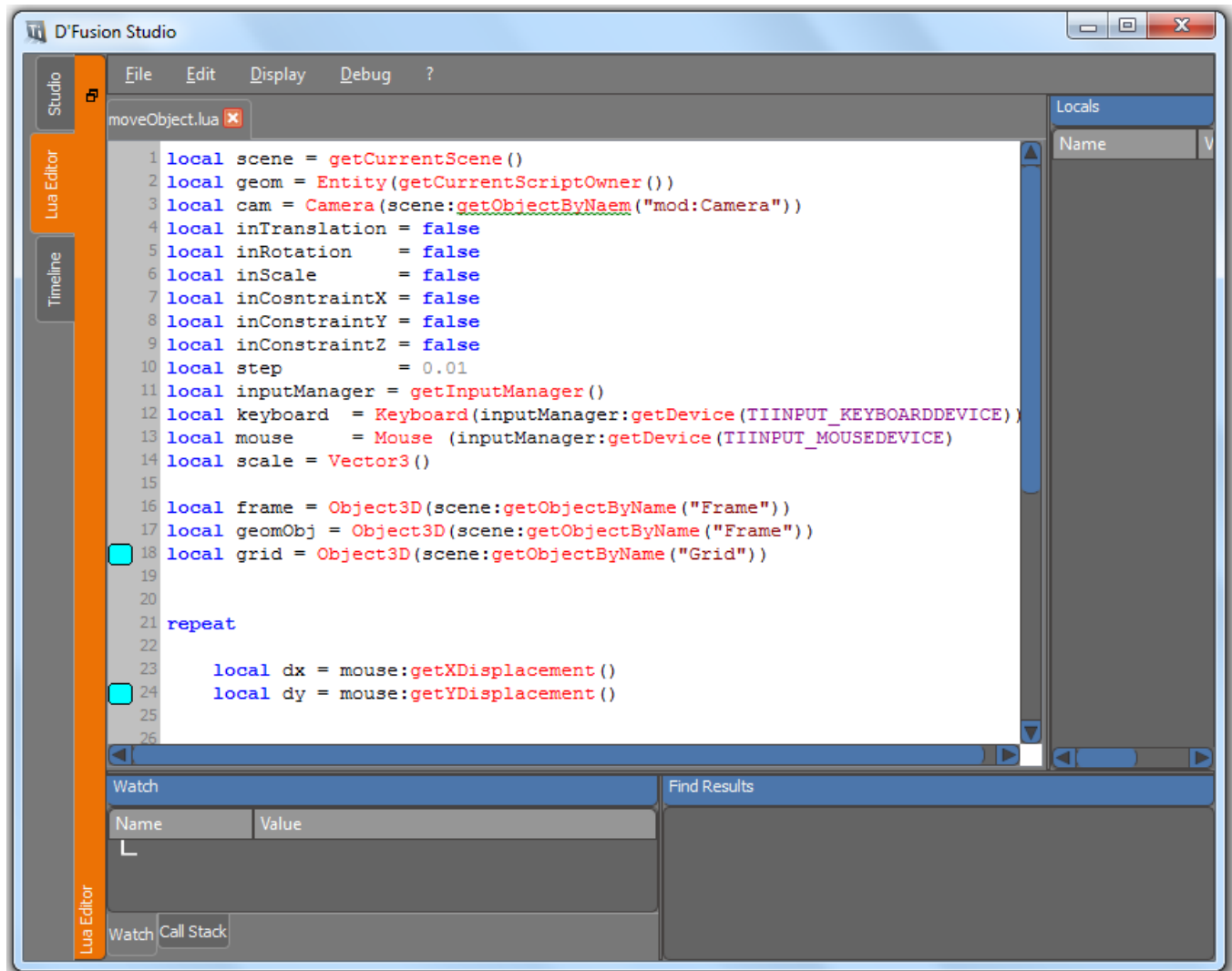
4.2.2 Syntax Highlighting

The editor will automatically color some specific text patterns for easier Lua code reading. Here is the meaning of the different default colors.

Bold dark blue	Lua key words (local, if, true...)
Red	Function/Method. If underlined, it means that the function is not recognized as a D'Fusion native function or method
Brown	Text string
Green	Comment
Purple	D'Fusion constant or enum
Blue	Lua native function and library methods (print, math.cos...)

4.2.3 Bookmarks

The Lua Editor allows you to add bookmarks to a script. Those bookmarks are markers which you can then later quickly jump to from anywhere else in the script.

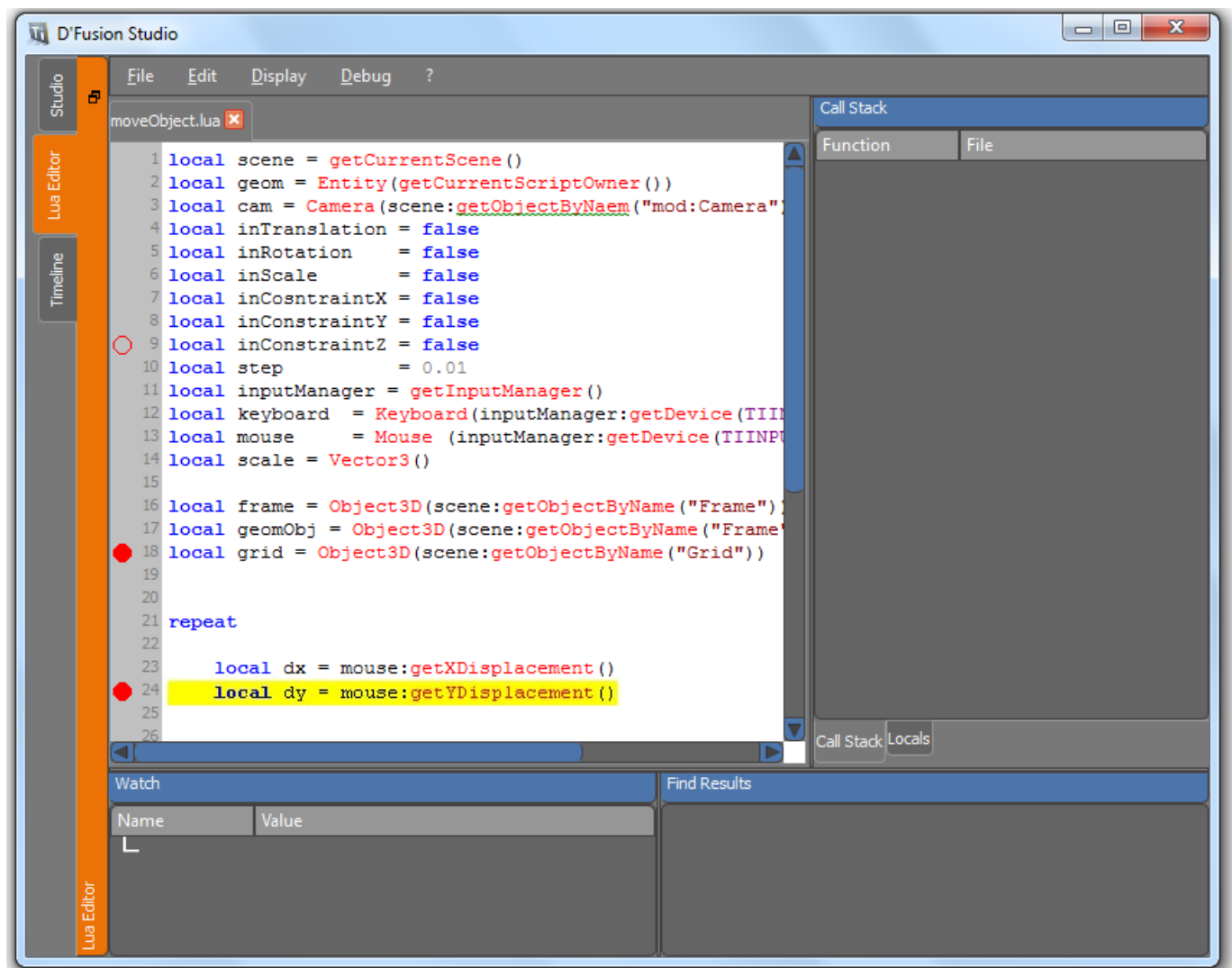


Bookmarks are represented as blue squares in the document margin. To set a bookmark on a specific line, place the cursor on the line and press *Ctrl+F2*.

Once one or several bookmarks are set, you can from anywhere in the script navigate between bookmarks by pressing the *F2* key.

4.2.4 Debug

The Lua Editor allows to add breakpoints to a script. A breakpoint is a signal that tells the debugger to temporarily suspend execution of your program at a certain point. When execution is suspended at a breakpoint, the program is said to be in break mode. Entering break mode does not terminate or end the execution of the program. Execution can be resumed (continued) at any time. During the timeout of the break mode, the user can examine parameter values and states to look for violations (bugs).



Breakpoints are represented in the document margin as red disks when enabled, or red circles when disabled.

To add/remove a breakpoint on a specific line, press *F9*, or use the menu *Debug > Add/Remove breakpoint*, or just click in the document margin.

To enable/disable a breakpoint on a specific line, press *CTRL+F9*, or use the menu *Debug > Toggle breakpoint*.

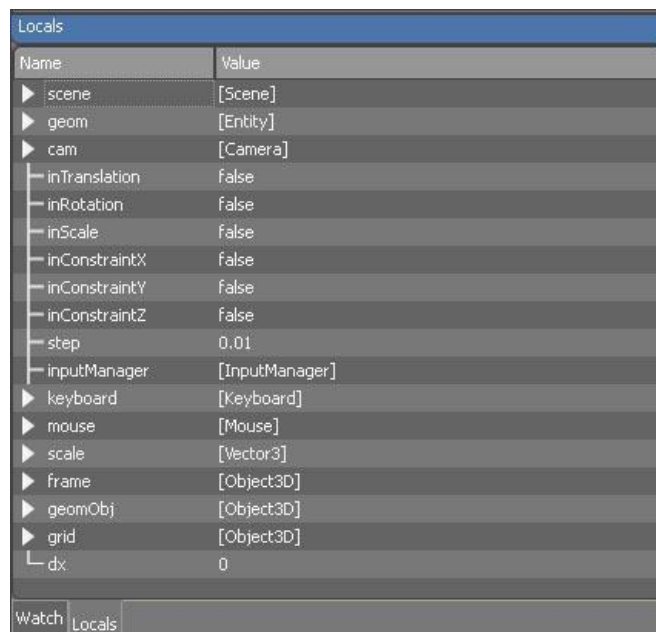
The current breaking line is underlined in yellow.

4.2.4.1 Variable windows

The debugger provides a number of variable windows for displaying, evaluating, and editing variables and expressions. Each variable window includes a grid with two columns: *Name* and *Value*. The *Name* column contains variable names or expressions. The *Value* column displays the value and data type of the variable or expression. When the variable is a D'Fusion object or a table, the *Value* column begins by displaying the object type; an object type is displayed as follows : *[Type]* (*[Scene]*, *[Entity]*, *[Camera]*, etc.)

The type of information displayed in the grid depends on which variable window you are using:

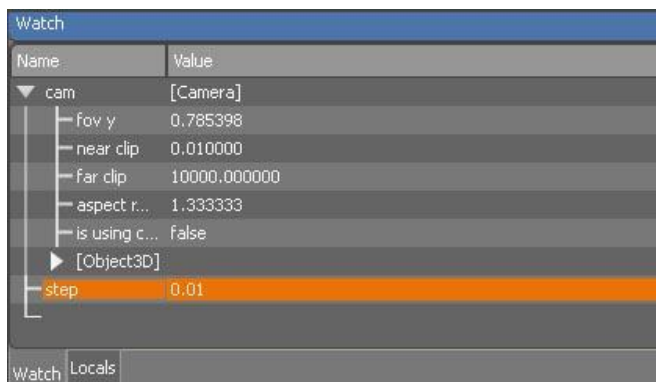
- The **Locals** window displays variables local to the current context or scope. Usually, this means the procedure or function you are currently executing. The debugger populates this window automatically.



Name	Value
▶ scene	[Scene]
▶ geom	[Entity]
▶ cam	[Camera]
inTranslation	false
inRotation	false
inScale	false
inConstraintX	false
inConstraintY	false
inConstraintZ	false
step	0.01
inputManager	[InputManager]
▶ keyboard	[Keyboard]
▶ mouse	[Mouse]
scale	[Vector3]
frame	[Object3D]
geomObj	[Object3D]
grid	[Object3D]
dx	0

Watch Locals

- The **Watch** window is where you can add variables whose value you want to watch.

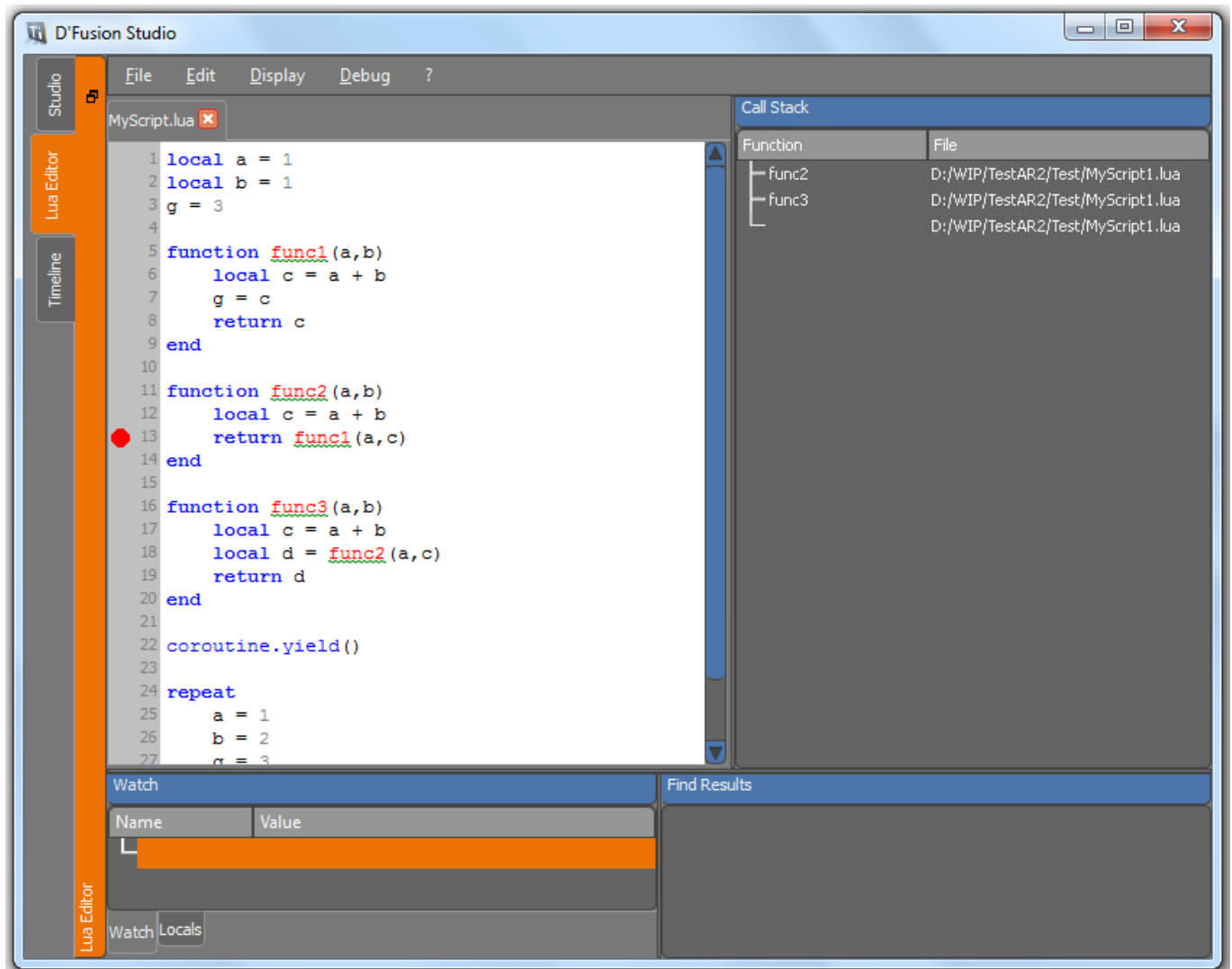


Name	Value
▼ cam	[Camera]
fov y	0.785398
near clip	0.010000
far clip	10000.000000
aspect r...	1.333333
is using c...	false
[Object3D]	
step	0.01

Watch Locals

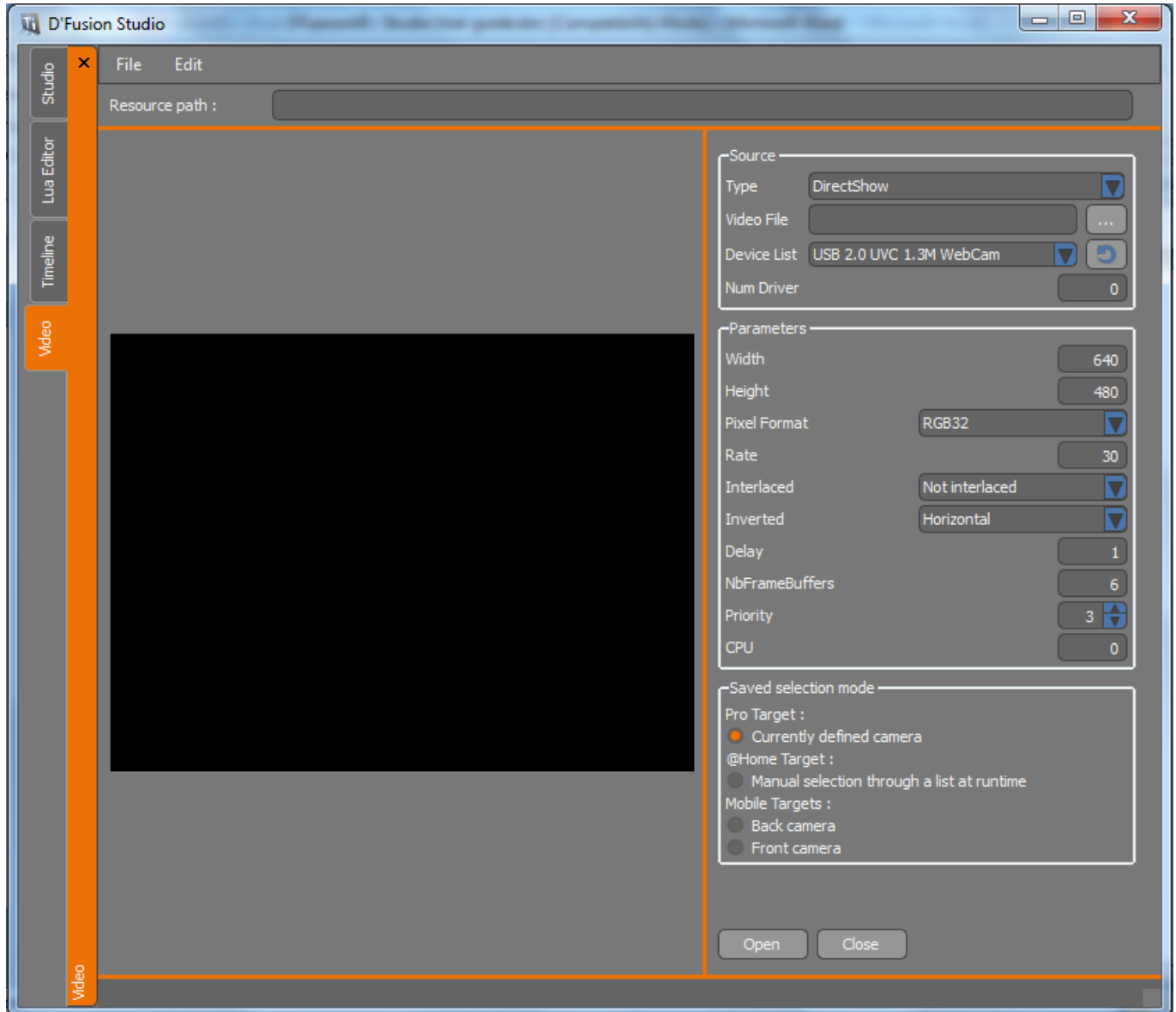
4.2.4.2 Call Stack

By using the **Call Stack** window, the user can view the function or procedure calls that are currently on the stack. The Call Stack window displays the name of each function and the file path of its source code.



5. VIDEO PANEL

Available from the "Studio" panel > "Tools" menu, the "Video" panel will allow you to configure your videocapture file.



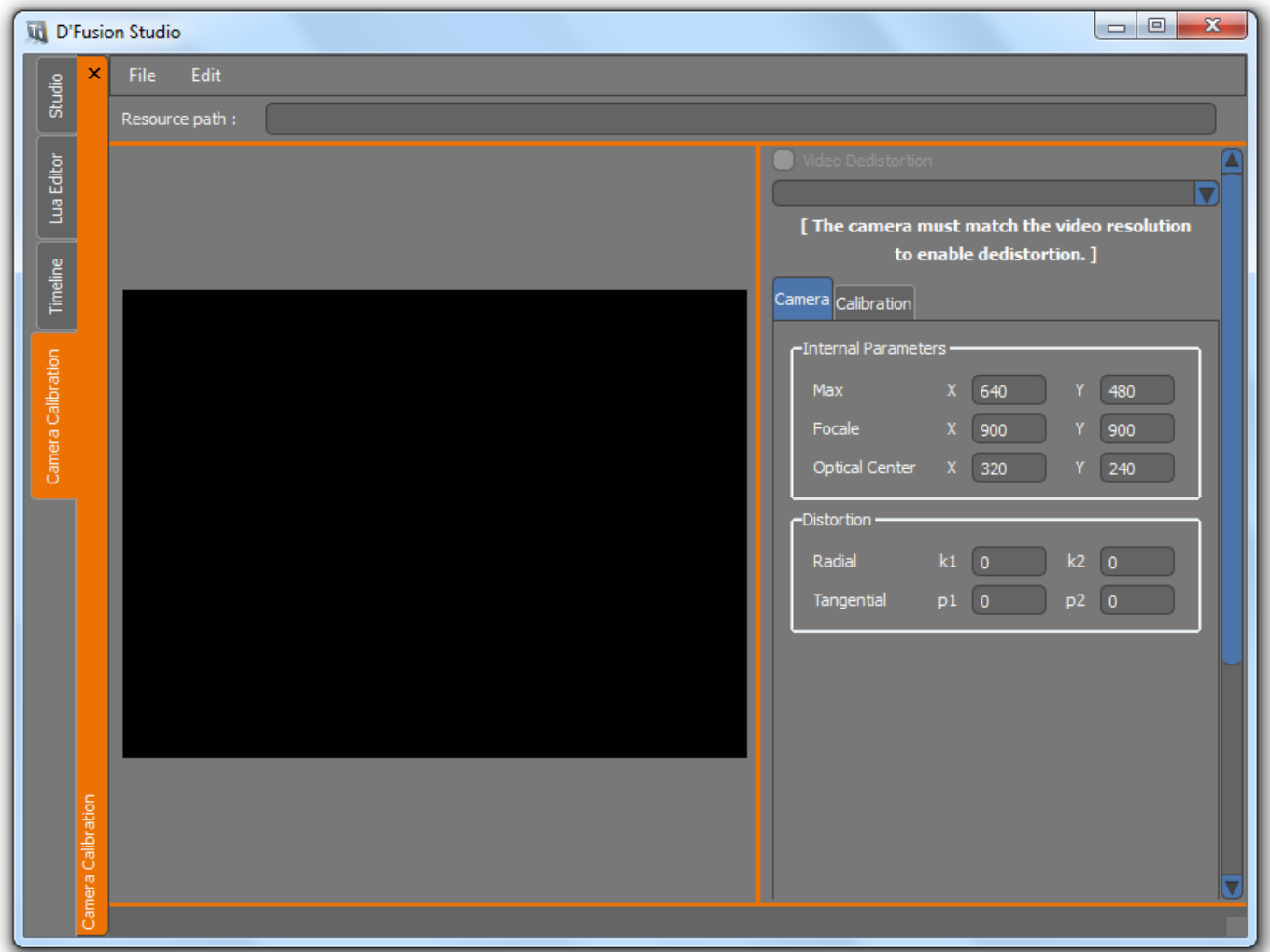
Type	Used framework for the videocapture
Video file	Let you define a video file if the videocapture is not a live video. Supported files depend on codec that are installed on the user computer.
Device List	Let you select directly the camera amongst available devices
Num Driver	Let you select directly the drive of the requested capture device
Capture width	Width of the videocapture
Capture height	Height of the videocapture
Pixel format	Pixel format of the videocapture

Rate	Let you specify capture rate in fps (must be compliant with the device capabilities).
Interlaced	Let you define if the video must be deinterlaced.
Inverted	Let you define image flips.
Delay	Let you specify video capture delay (a number of frames). This delay is not taken into account for the tracking application.
NbFrameBuffers	Let you specify the size of the buffer to record video frames.
Priority	Let you specify the video capture thread priority.
CPU	Let you specify the video capture thread CPU.
Saved Selection Mode	Lets you define the camera device to use at playtime: <ul style="list-style-type: none">- Pro target: use the device specified in "Device List";- @Home target: the device to use can be chosen at runtime (start);- Mobile target - Back camera: use the Mobile back camera;- Mobile target - Front camera: use the Mobile front camera.
Open	Opens the videocapture.
Close	Closes the videocapture.

See also the Computer Vision "Video Manager" panel documentation in [05] more information.

6. CAMERA CALIBRATION PANEL

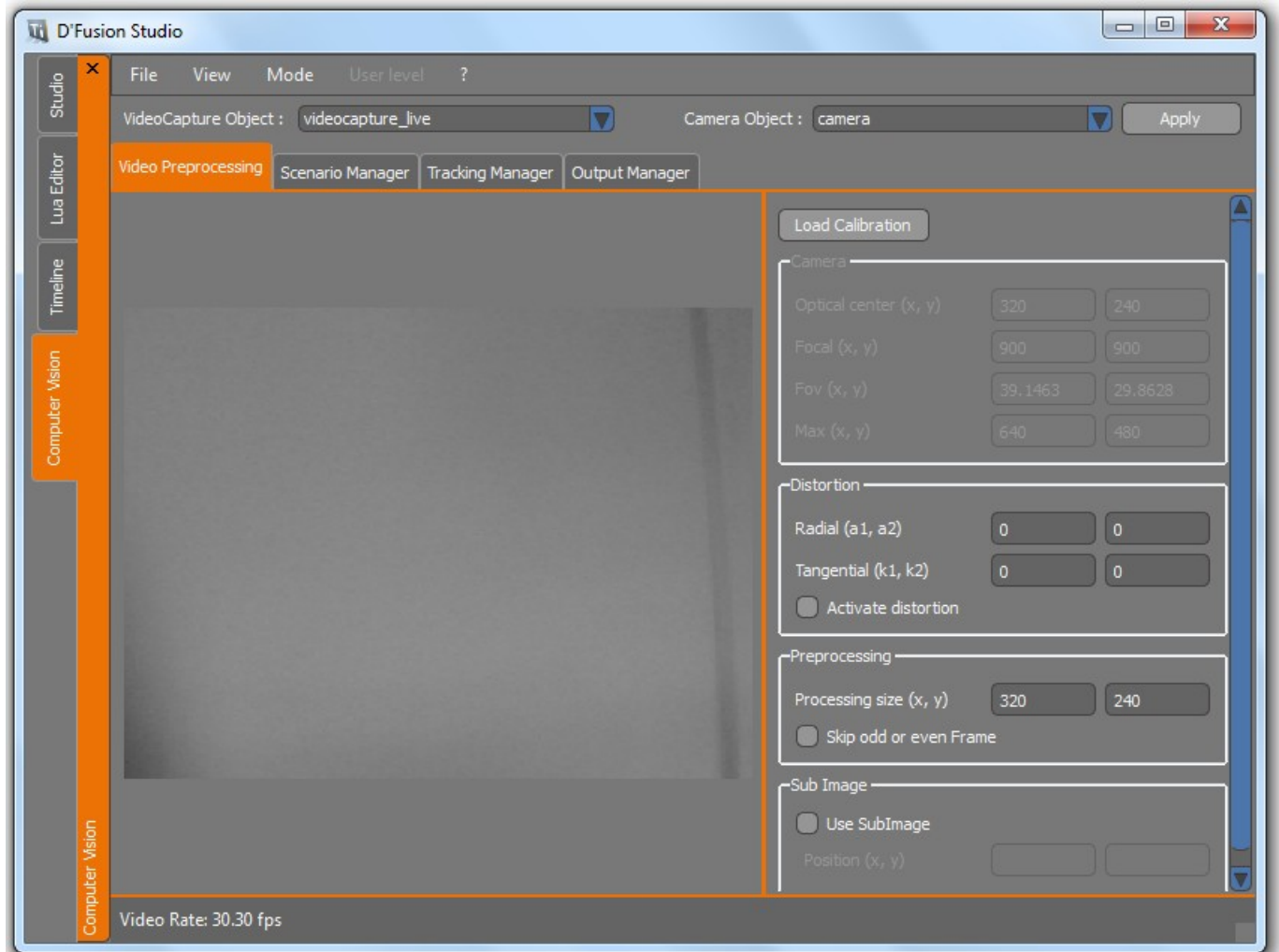
Available from the "Studio" panel > "Tools" menu, the "Camera Calibration" panel will allow you to specify the physical characteristics of your camera by configuring the camera calibration file.



See the D'Fusion Computer Vision "Distortion Manager" panel documentation in [05] for more information.

7. COMPUTER VISION PANEL

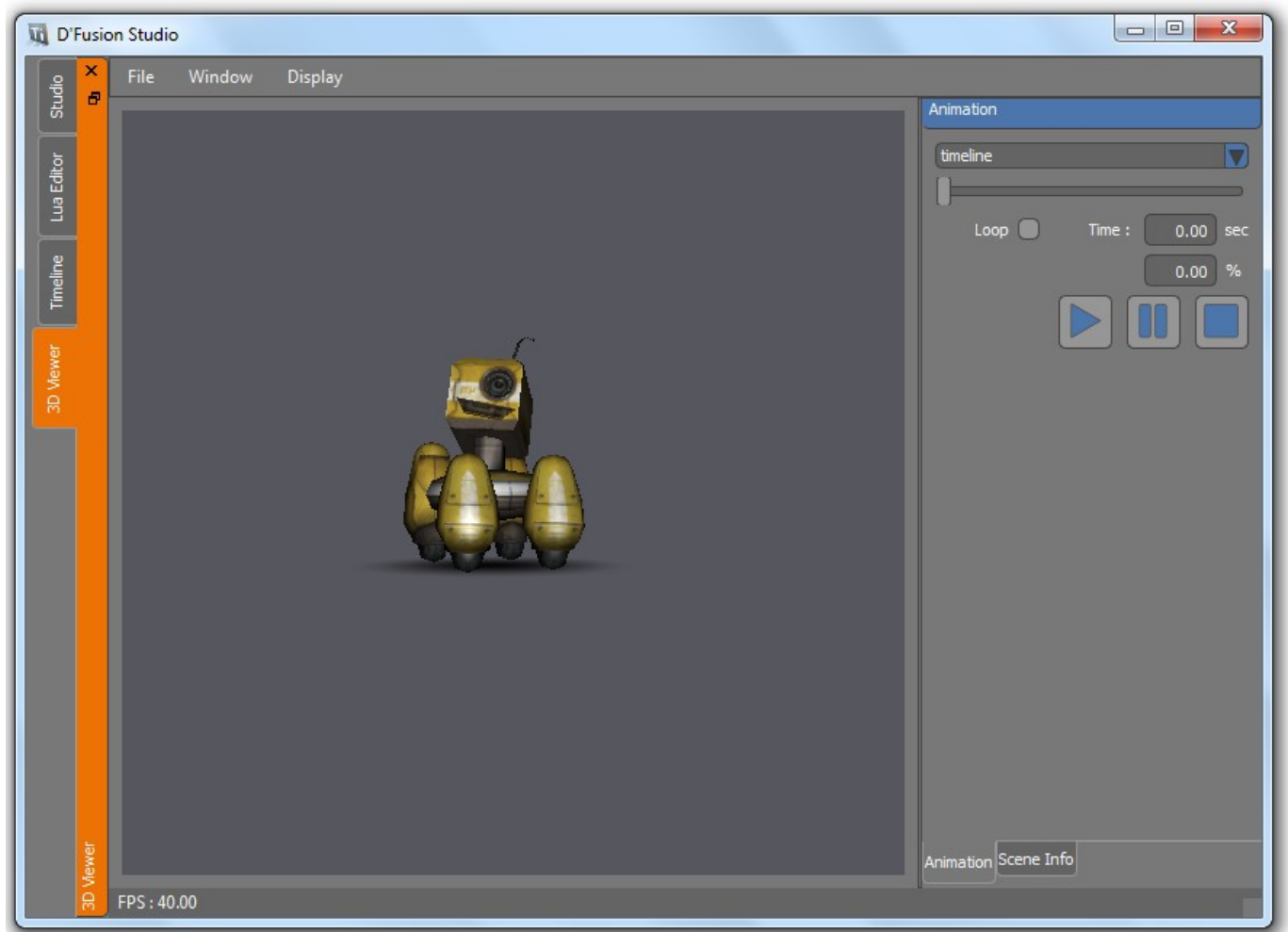
Available from the "Studio" panel > "Tools" menu, the "Computer Vision" panel will allow you to create tracking scenarios.



Refer to the D'Fusion Computer Vision "Scenario Manager" panel documentation in [05] for more information.

8. 3D VIEWER PANEL

Available from the "Studio" panel > "Tools" menu, the "3D Viewer" panel will allow you to review the 3D information of your scenette objects like mesh, animation and geometry.



9. APPENDIX: XML FILES FOR DEVICE EMULATION

The behaviour of each device can be described in XML files. Then, these files can be used in D'Fusion Studio to simulate devices and help to debug a scenario. (cf macro manager section)

The file contains all the events of the device. It begins with the root tag <dfusioninputdevice> and this tag is mandatory.

9.1 Device

You can define devices with the <device> tag. You can define several devices in a same file:

```
<dfusioninputdevice>
  <device type="accelerometer">
    ...
  </device>
  <device type="compass">
    ...
  </device>
</dfusioninputdevice>
```

Device - Parameters

Parameter : 'type'	Type : 'string'	MANDATORY
--------------------	-----------------	-----------

Possible values are

- accelerometer
- compass
- gps
- joystick
- gps
- keyboard
- mouse
- touchscreen

Parameter : 'id'	Type : 'integer'	default value : "0"
------------------	------------------	---------------------

This parameter is evaluated if type="joystick". It the id of the joystick.

9.2 Accelerometer

```
<device type="accelerometer">  
    <value accelY = "0" accelX = "-0.019444517791271" time = "4.736663" accelZ = "-1.1250041723251" />  
    ...  
</device>
```

Accelerometer - Parameters		
Parameter : <code>'time'</code>	Type : <code>'float'</code>	MANDATORY
Time of the value		
Parameter : <code>'accelX'</code>	Type : <code>'float'</code>	MANDATORY
X acceleration. Unit is G (gravity)		
Parameter : <code>'accelY'</code>	Type : <code>'float'</code>	MANDATORY
Y acceleration. Unit is G (gravity)		
Parameter : <code>'accelZ'</code>	Type : <code>'float'</code>	MANDATORY
Z acceleration. Unit is G (gravity)		

9.3 Compass

```
<device type="compass">  
    <value oriY = "-1" time = "4.736663" accuracy = "-1" oriX = "0" heading = "0" oriZ = "0" />  
    ...  
</device>
```

Compass - Parameters		
Parameter : <code>'time'</code>	Type : <code>'float'</code>	MANDATORY
Time of the value		
Parameter : <code>'oriX'</code>	Type : <code>'float'</code>	MANDATORY
X orientation in degrees		
Parameter : <code>'oriY'</code>	Type : <code>'float'</code>	MANDATORY
Y orientation in degrees		
Parameter : <code>'oriZ'</code>	Type : <code>'float'</code>	MANDATORY
Z orientation in degrees		
Parameter : <code>'accuracy'</code>	Type : <code>'float'</code>	MANDATORY
Accuracy		

Compass - Parameters

Parameter : `'heading'` Type : `'float'` MANDATORY

Angle between the phone direction and magnetic north in degrees

9.4 Gps

`<device type="gps">`

`<value verticalaccuracy = "75" course = "0" horizontalaccuracy = "75" altitude = "0" longitude = "2.2301833629608" timestamp = "1288780624523" speed = "0" latitude = "48.873119354248" />`

...

`</device>`

Gps - Parameters

Parameter : `'time'` Type : `'float'` MANDATORY

Time of the value

Parameter : `'verticalaccuracy'` Type : `'float'` MANDATORY

Vertical accuracy in meters. A negative value indicates an invalid altitude.

Parameter : `'course'` Type : `'float'` MANDATORY

Course in degrees from the north pole. A negative value indicates an invalid course.

Parameter : `'horizontalaccuracy'` Type : `'float'` MANDATORY

Horizontal accuracy in meters. A negative value indicates an invalid location

Parameter : `'altitude'` Type : `'float'` MANDATORY

Altitude in meters

Parameter : `'longitude'` Type : `'float'` MANDATORY

Longitude in degrees.

Parameter : `'timestamp'` Type : `'float'` MANDATORY

Time in seconds since January 1, 1970 of the last update.

Parameter : `'speed'` Type : `'float'` MANDATORY

Speed in meters per second. A negative value indicates an invalid speed.

Parameter : `'latitude'` Type : `'float'` MANDATORY

Latitude in degrees

9.5 Keyboard

```
<device type="keyboard">
  <value time="1.098017" >
    <event keycode="TIKEYBOARD_Q" virtualkey="TIKEYBOARD_A" pressed="true" />
    ...
  </value>
  ...
</device>
```

Keyboard - Parameters		
Parameter : <code>'time'</code>	Type : <code>'float'</code>	MANDATORY
Time of the value		

9.6 Touchscreen

```
<device type="touchscreen">
  <value time="7.272949" >
    <touch id="1" x="324.1237" y="154.1856" taps="1" />
    ...
  </value>
  ...
</device>
```

Touchscreen - Parameters		
Parameter : <code>'time'</code>	Type : <code>'float'</code>	MANDATORY
Time of the value		

Touchscreen touch - Parameters		
Parameter : <code>'id'</code>	Type : <code>'integer'</code>	MANDATORY
Touch id		
Parameter : <code>'x'</code>	Type : <code>'float'</code>	MANDATORY
Position x		
Parameter : <code>'y'</code>	Type : <code>'float'</code>	MANDATORY
Position y		
Parameter : <code>'taps'</code>	Type : <code>'integer'</code>	MANDATORY
Number of taps that corresponds to a given id		

9.7 Mouse

```
<device type="touchscreen">  
  <value time="1.098017" >  
    <event controlid="0" value="17" />  
    <event controlid="3" value="true" />  
    ...  
  </value>  
  ...  
</device>
```

Mouse - Parameters		
Parameter : <code>'time'</code>	Type : <code>'float'</code>	MANDATORY
Time of the value		

Mouse event - Parameters		
Parameter : <code>'controlid'</code>	Type : <code>'integer'</code>	MANDATORY
Time of the value		
Parameter : <code>'value'</code>	Type : <code>'boolean'</code> or <code>'integer'</code>	MANDATORY
True if the control is a button and this button is pressed False if the control is a button and this button is released Integer value if the control is an axis (x, y, wheel)		

9.8 Joystick

```
<device type="joystick" id="0" >
  <value time="1.098017" >
    <event controlid="0" value="17" />
    <event controlid="12" value="true" />
    ...
  </value>
  ...
</device>
```

Joystick - Parameters

Parameter : 'time'	Type : 'float'	MANDATORY
Time of the value		

Joystick event - Parameters

Parameter : 'controlid'	Type : 'integer'	MANDATORY
Time of the value		
Parameter : 'value'	Type : 'boolean' or 'integer'	MANDATORY
True if the control is a button and this button is pressed False if the control is a button and this button is released Integer value if the control is an axis		